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PC WORLD

May 1993

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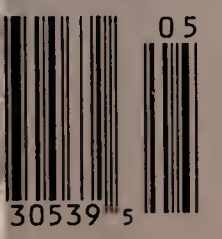

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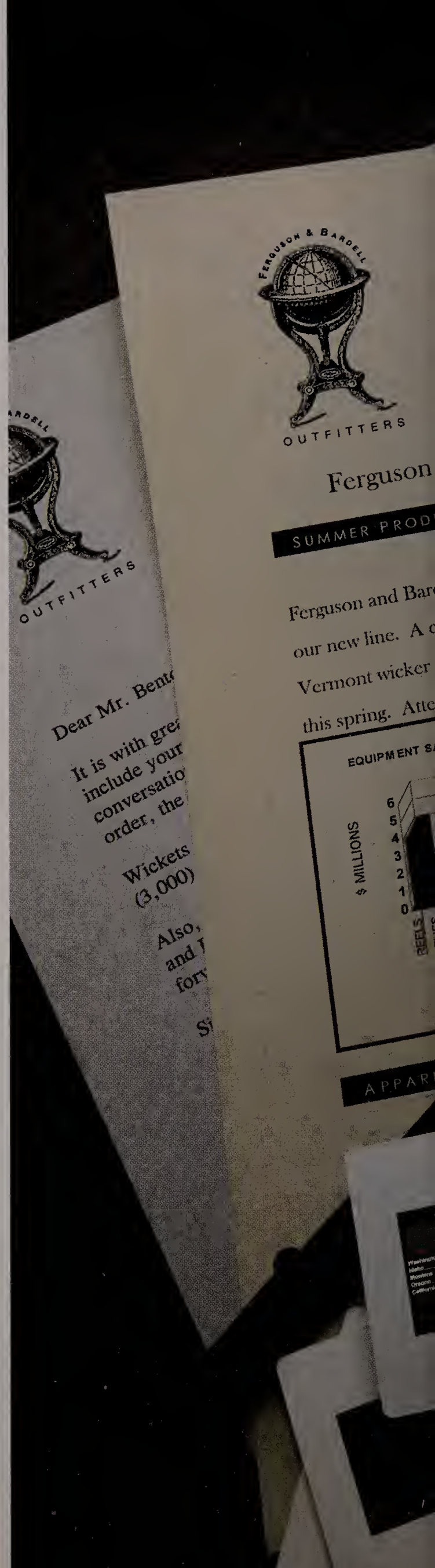

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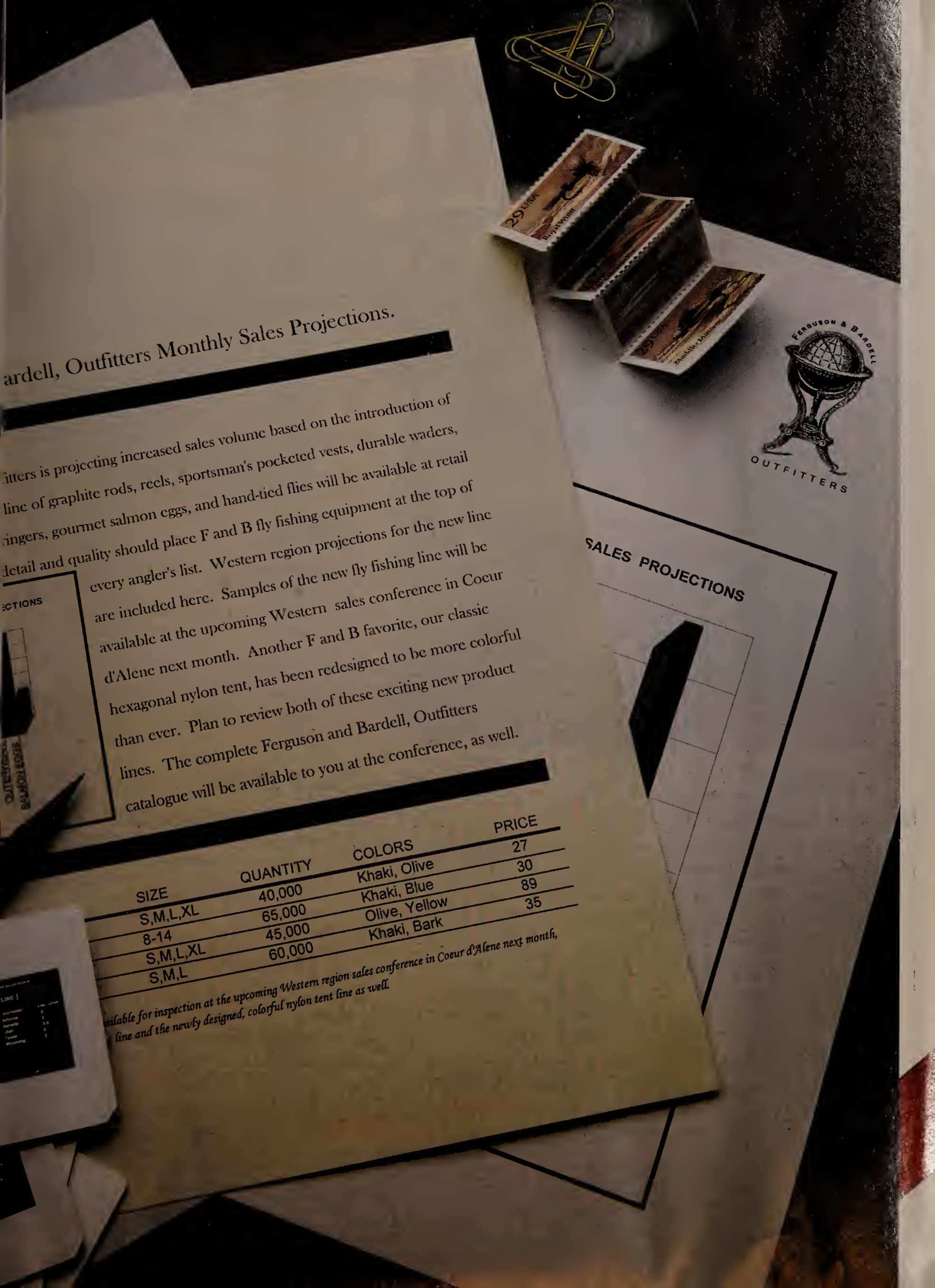

ardell, Outfitters Monthly Sales Projections.

itters is projecting increased sales volume based on the introduction of line of graphite rods, reels, sportsman's pocketed vests, durable waders, ingers, gourmet salmon eggs, and hand-tied flies will be available at retail detail and quality should place F and B fly fishing equipment at the top of every angler's list. Western region projections for the new line are included here. Samples of the new fly fishing line will be available at the upcoming Western sales conference in Coeur d'Alene next month. Another F and B favorite, our classic hexagonal nylon tent, has been redesigned to be more colorful than ever. Plan to review both of these exciting new product lines. The complete Ferguson and Bardell, Outfitters catalogue will be available to you at the conference, as well.

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FERGUSON & BARDELL OUTFITTERS

SALES PROJECTIONS

PC WORLD

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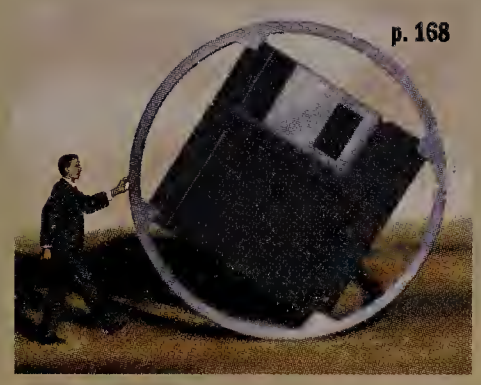
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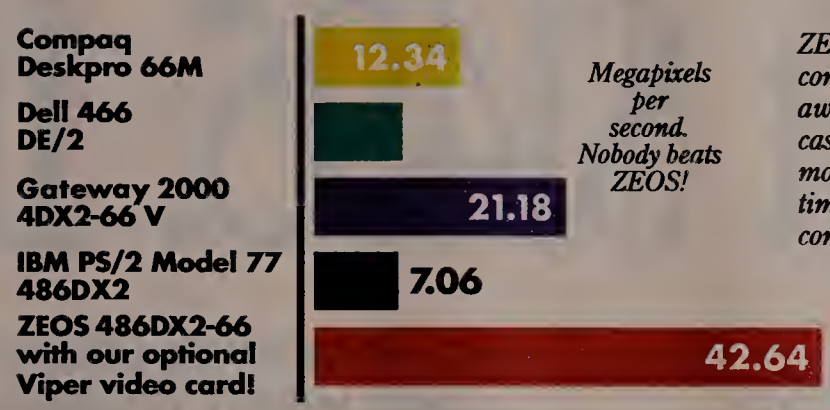

ZEOS "blew all competitors away—in some cases performing more than ten times as fast as competitors."
–PC Magazine, 1/26/93

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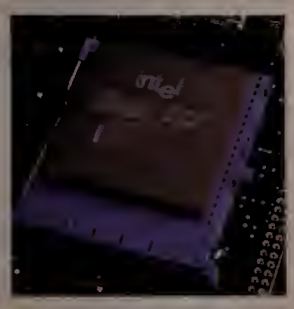

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–*PC Magazine*, January 26, 1993

"ZEOS' engineering and quality advantages... clearly distinguish the ZEOS product from similarly priced machines."

–*Forbes*, March 1, 1993

"An array of features to make a user's mouth water."

–*PC Magazine*, January 26, 1993

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–*PC World*, February 1993, Best Buy

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–*PC World*, February 1993, Best Buy

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–*PC Computing*, March 1993, Best Value

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–Jim Seymour, *PC Magazine*, Feb. 9, 1993

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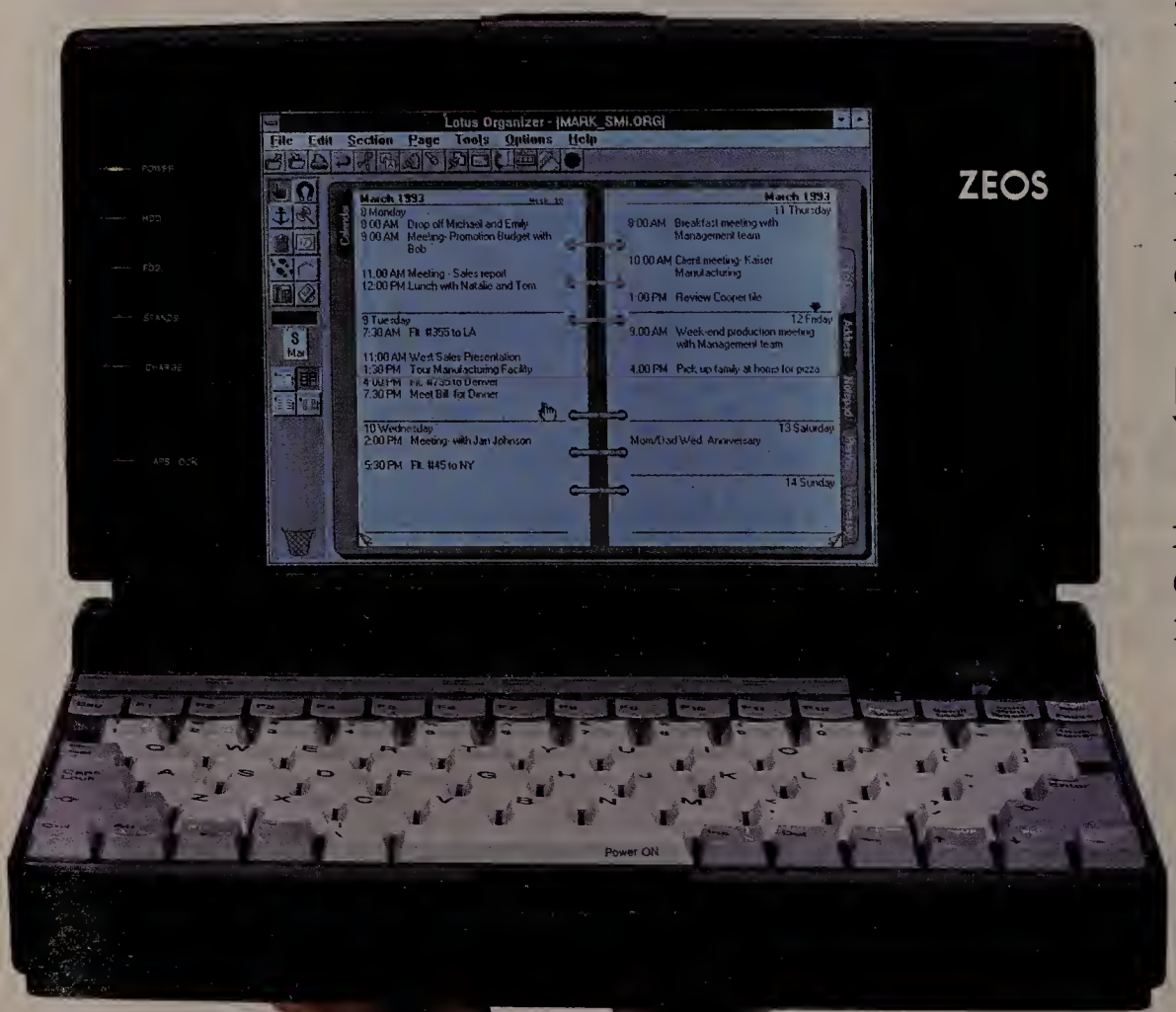

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Smaller than a notebook, powerful as a desktop. At only 3.9 lbs., the new ZEOS Contenda keeps you light on your feet.

#1 Contenda.™

and Windows applications. *And we give you all three!* Including the new Lotus Organizer—the personal information manager that's so easy to use, it could make your DayTimer obsolete. Check out our upgrade packages on the right for complete details.

And for you true road warriors, take a look at Package III. It gives you all the goodies—like a nylon carrying case, extra battery and internal fax modem—everything you need to stay productive on the road. All for under $2000!

	ZEOS Contenda	Gateway Handbook	Dell 320SLi
Processor	**Intel 386SL**	Chips & Tech. F8680	Intel 386SL
Processor Speed	**25MHz**	10MHz	20MHz
RAM	**2MB to 10MB**	1MB to 3MB	2MB to 10MB
Hard Drive	**80MB**	40MB	60MB
Screen	**VGA Backlit**	CGA Backlit	VGA Reflective
Runs Windows	**Yes**	No	Yes
Built-in Pointing Device	**Yes**	No	No
Footprint	**9.7" x 6.1"**	9.8" x 5.9"	11.0" x 7.8"
24 Hour Support	**Yes**	No	No
PRICE	**$1495**	$1295	$1898

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- CPU: Intel 386SL
- Processor Speed: 25MHz
- RAM: 2MB expandable to 10MB
- Hard Drive: 80MB
- Display: VGA backlit, 640x480, .23 dot pitch, Sharp 7.4" diagonal
- Battery: NiMH; operating time up to 4 hours; a snap to remove
- Size: 9.7" x 6.1"
- Weight: Only 3.9 lbs.
- Power Management: Fully featured, including De-turbo, Standby and Suspend
- Keyboard: Comfortable 80-key with embedded numeric keypad
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- Pointing Device: Easy-to-use built-in trackball
- Warranties & Guarantees: ZEOS award-winning 24-Hour Toll-Free Technical Support, 30-Day Absolute Satisfaction Money-Back Guarantee, complete Customer Satisfaction Package

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America Online: MPC World
CompuServe: 75300,2503
MCI Mail: MPC
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Circle 71 on reader service card

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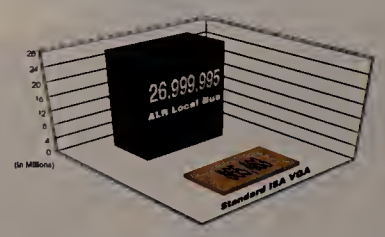

Video Performance Under Windows
i486DX2/66 CPU, Winmarks V.2.5 High Score Wins

intel inside

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Circle 9 on reader service card

Call for Action: Saving the Nation's Hands From RSI

We long for the full realization of Bill Gates's vision of "information at your fingertips," because PCs have already simplified our jobs and made us more productive. We expect more progress with each passing year. The last thing we expect is for PCs to change our lives for the worse. Most PC users have seen no ill effects and received many benefits from years of using keyboards and mice. If we've heard of repetitive strain injury (RSI), we probably think of it as something that makes a wrist or hand sore but does nothing serious and vanishes quickly with a minor alteration in work habits.

Yet, along with all the valuable information at your fingertips, there lurks real danger. RSI can change your life forever. The problem is serious and widespread precisely because injury occurs gradually and imperceptibly. Before you sense there's a problem, you're feeling pain here and numbness there, and suddenly a doctor is telling you not to touch a keyboard or pick up your baby until further notice. This is the advice Associate Editor Roberta Furger got from her physician recently. If the problem is carpal tunnel syndrome, you may face hand surgery—which is by no means trivial, as I can attest, having undergone hand surgery myself last year (for an ailment unrelated to mouse or keyboard use). I found dictation so slow and awkward, I preferred typing with my left hand, switching from the keys to a mouse as needed. I too was deprived of the pleasure of picking up my 2-year-old son, and even found it impossible to turn a storybook's pages when holding him in my lap.

What we forget is that the keyboard we pound is also pounding us. Roberta often used a headset for telephone interviews and transcribed by high-speed typing for hours a stretch. The pounding took its toll. She has undergone intensive physical therapy and altered her work habits, and her condition is improving somewhat. But her activity is still restricted, and recovery is not assured. Roberta's all too firsthand experiences give her article "Danger at Your Fingertips" a degree of realism that is rare in reporting. The article reveals and analyzes a problem that costs U.S. business billions of dollars a year, disrupts the lives of thousands of people, and promises to worsen as computers proliferate in the United States. If you read nothing else in this issue, read Roberta's article.

MICHELE CLEMENT

We hoped to bring news of a solution along with our report on RSI. We are able to report on a number of interesting attempts to make less stressful keyboards and pointing devices (see *Top of the News*). Common sense suggests many of these relieve stress, but we were extremely disappointed at the dearth of information from serious long-term studies on the effects of different keyboards and pointing devices.

Research Must Start Now

With so much at stake for so many individuals and businesses, we think that it's time for federal funding of a large-scale study to identify input device designs that present no health hazards. Decades of uncontrolled experimentation in the marketplace will eventually reveal satisfactory designs, but the cost in pain, reduced productivity, and medical expenses can be lessened if systematic studies take place. On behalf of those millions of Americans whose PCs are indispensable tools, we are calling on Hillary Rodham Clinton and her presidential task force to make such a study part of the nation's health-care agenda (see *Consumer Watch*).

PC World
Editor in Chief
Phil Lemmons

DOS 6.0 or DOS 6.0?

As you will read in this month's cover story, DOS 6.0 now includes everything, but don't count out utilities companies such as Central Point, Symantec, PC-Kwik, and Stac. Microsoft maintains its commitment to all "open" standards it owns and controls, and utilities vendors remain in charge of keeping your PC in tune, backed up, and virus free. Besides, several utilities companies are bundling versions of their products with IBM's DOS 6.0, due out before the end of June. High-level IBM officials say their DOS 6.0 will be 20 percent faster than Microsoft's and fully compatible and will include more fully featured versions of leading utilities. IBM is striving mightily to sell its DOS 6.0 to many systems manufacturers.

Phil Lemmons

Phil Lemmons, Editor in Chief

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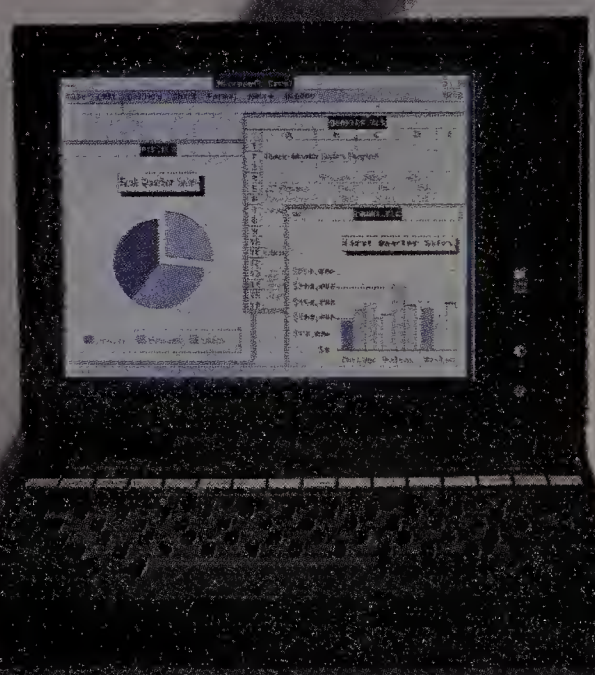

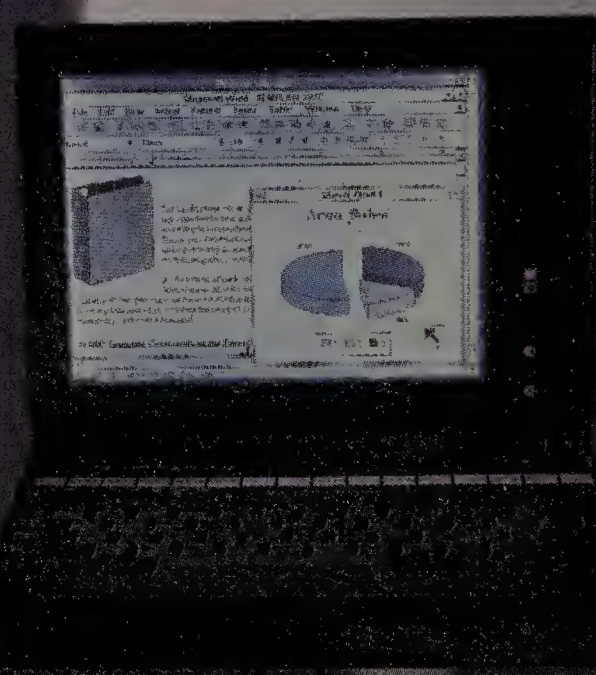

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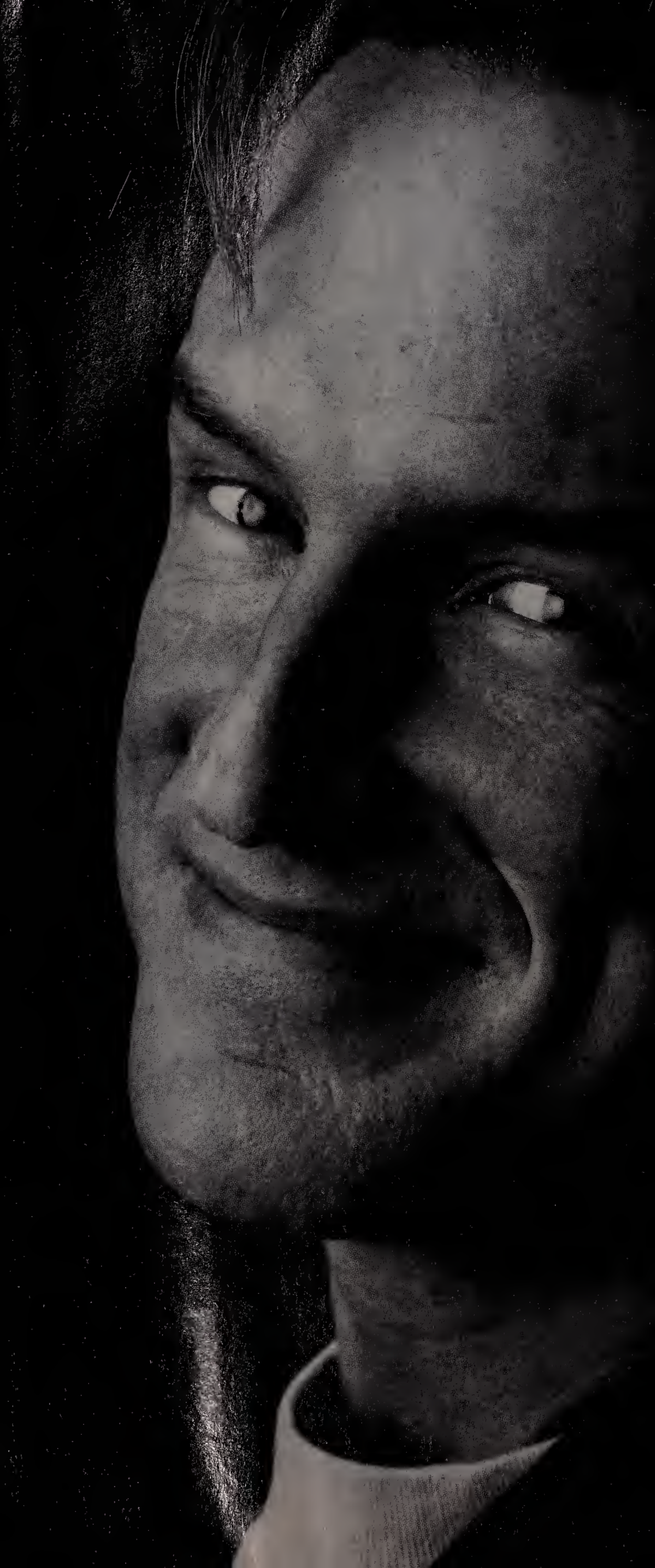

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er describes is indeed the way OS/2 is supposed to work. In my testing, however, when an application hung, the <Ctrl>-<Esc> key combination usually had no effect—no matter how long I waited. IBM told me to use <Ctrl>-<Alt>-<Delete> instead. That didn't always work either, but when it did, it killed not only the hung application but everything else as well—which was the design flaw I was trying to point out. —*Robert Lauriston*

The Two Faces of a Rogue

In his account of how several members of the *PC World* staff set up their own *Windows for Workgroups* network on top of a Novell LAN ["Windows for Workgroups: Operation Rogue," February], Steve Fox mentions that "our LAN administrator was not exactly happy with our roguish peer-to-peer sitting atop their pristine LAN." I'd say your network administrator showed a lot of restraint. If someone pulled a stunt like that behind my back while I was a manager of information services, I'd have him or her fired. A company depends absolutely on the reliability of its network. The last thing you want is some amateur monkeying around with it and potentially causing problems for other users.
Kenneth Sax, Cincinnati

We'd been toying with setting up a network in our office of 11 PCs but hadn't taken the plunge because we had no network experience. "Windows for Workgroups: Operation Rogue" convinced us to give it a try. Four of us have been running *Windows for Workgroups* on a trial basis for the last two weeks or so, and despite some initial configuration problems, we're pleased with the results (and the after-hours Hearts games). If we're still satisfied after another month, we plan to hook up the rest of the office. Thanks for the inspiration.
Douglas Keogh, New York City

It's a Fight to Switch

In "The Windows Spreadsheet Challenge" in January, you knock *Excel*'s weakness in converting DOS-based *1-2-3* users. However, you never mention those of us who are switching from the Macintosh.

Even though *Excel* began on the Mac, none of the keyboard commands for the Mac version work on the PC version, yet you *can* make *Excel* more like *1-2-3* (for God's sake why?). Aldus succeeded in making Mac users feel at home by having all the Mac keyboard commands available on all their PC products. Why can't Microsoft do the same?
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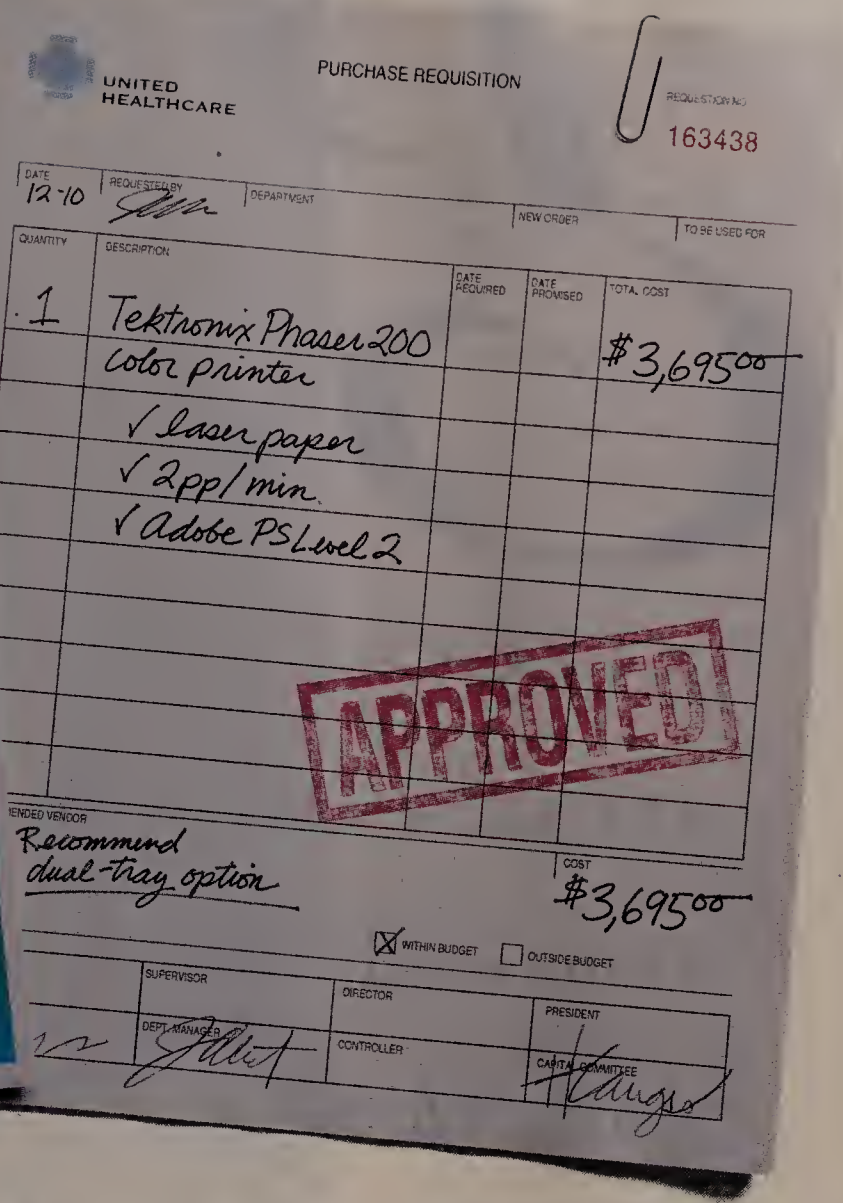
Making a Laptop Windows Screen Friendly

If your LCD screen pales in the face of *Windows*, double-click Color in the control panel and change to one of the three LCD screen settings in the Color Schemes list. After leaving Color, double-click Mouse, and check the Mouse Trails check box.

Shane Rau
Assistant Technical Editor



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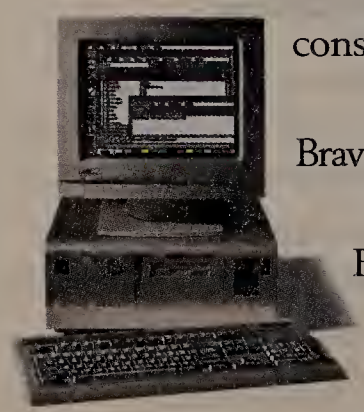
EVEN as his model aircraft *screamed* into the oak, our AST designer remained PREOCCUPIED with *thoughts of PCs.*

Even in their free time, our engineers are obsessed with PCs. A condition that can turn an afternoon with a model plane into an adventure. But it's a small price to pay when you consider the results: the third-generation AST Bravo desktop PCs. With Bravo, our engineers addressed the issue of PC price/performance head-on. First, they enhanced Windows™ performance. Then, they improved reliability while reducing costs by creating an upgradable, four-layer systemboard that's half its previous size. It's just one more example of how AST has been setting PC standards for over 13 years. In fact, our latest Bravo series has already won the praise of *BYTE, PC World* and *InfoWorld*. While our flying has won the praise of, well...



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BRAVO

POWER

Intel 486SX/25, 486SX/33, 486DX/33, 486DX2/50 or 486DX2/66 microprocessor. Optional 256KB second-level cache.

GRAPHICS

Video RAM upgradable to 1MB. Super VGA video controller supports 1024 x 768 color resolution.

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Four drive bays, four 16-bit ISA slots. Up to 64MB memory.

BUNDLED

120MB hard drive, 4MB RAM, 1MB Video RAM, high-res video monitor, mouse, pre-installed MS-DOS 5.0 and Windows 3.1.

RELIABLE

All models tested and compatible with the leading networking environments. All bundles are pre-configured and tested prior to shipping. Three-year warranty with standard one-year on-site service.

HONORS

BYTE *"1992 Award of Merit" (Bravo family).* PC World *"Best Buy" (4/66D).* InfoWorld *"Buyers Assurance Seal" (4/66D).*

RESPONSIVE

To learn more about our Bravo desktop PCs, just call 800-876-4AST.

AERODYNAMIC

A radio-controlled Gee Bee Super Sportster. With an 80cc gas-powered engine, it has a top speed of 160 mph. All optional, of course.

intel inside

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Not So Compatible

I disagree with the evaluation of *1-2-3 for Windows* in "The Windows Spreadsheet Challenge." The article touts *Excel*'s Help for Lotus 1-2-3 Users feature that translates *1-2-3* keystrokes. The biggest single weakness of this translator is that it doesn't recognize keystrokes to operate the Wysiwyg menu. Both *Excel* and *Quattro Pro* force you to learn their way of dressing up reports. *1-2-3 for Windows* lets those switching to a *Windows* spreadsheet use their old keystrokes while they gradually learn the new ones.

Another issue not given enough attention is macros. *Excel* and *Quattro Pro for Windows* both run *1-2-3* macros as long as they don't use *1-2-3* release 3.*x* or Wysiwyg commands. *1-2-3 for Windows* can handle macros that use these commands.
Ricardo Dobson, Louisville, Kentucky

A Quick-Drying Mess

Your review of the Canon BJ-200 printer ["High Quality From a Small Printer," January] was informative and covered all the positive features of this ink jet printer. I bought the BJ-200 and have used it daily.

However your statement that "the printer uses quick-drying ink, so the printhead moves closer to the paper" is misleading and misrepresents the primary deficiency of ink jet printers: The ink is not permanent (as are inks for dot matrix, daisy wheel, or laser printers) and smears when moisture touches the page.

None of the ads, reviews, publications, or brochures cover this problem. It means that anyone who requires a permanent ink print cannot use this, or any, ink jet or bubble printer.

Will Canon develop a permanent ink for the BJ-200? I, for one, hope it does.
Robert L. Hewitt, Oroville, California

Author's response: In fact, Canon's ink does dry quickly, enabling closer printhead positioning and faster printing. I smear my greasy fingers over my BJ-200 output all the time with no problems. As for splashing water on the pages, a spokesperson tells me that Canon's insistence on using nontoxic ink leaves water-soluble ink as its only option. Canon is working on a waterproof version, but it isn't sure when that will ship.
—Mike Hogan

Mail your reactions, responses, and ideas to Letters, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to the Letters forum on PC World Online; CompuServe, 74055,412; MCI Mail, PC World Editorial; or 415/442-1891 (fax). Include your name, city, state, and phone number. We reserve the right to edit letters.* ■

POWER TIP no. 277

Silence the Modem Shriek
Can't stand the Ethel Merman shriek of your modem? If your communications program has a terminal mode, simply type ATL0 and dial away, or place the command before your dialing string—it will silence the shrieks.

Robert Luhn
Contributing Editor

GREAT THINGS COME IN SMALL PACKAGES

This powerful print server can tackle your biggest network printing problems

- Connects any parallel printer directly to your Ethernet LAN
- Fully Novell Netware 286 and 386 compatible
- Can attach to 8 file servers simultaneously
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- Combines high-speed printing and exceptional printer control
- Supports encrypted passwords, forms, notify, cancel, and others
- Full one-year warranty and unlimited free technical support
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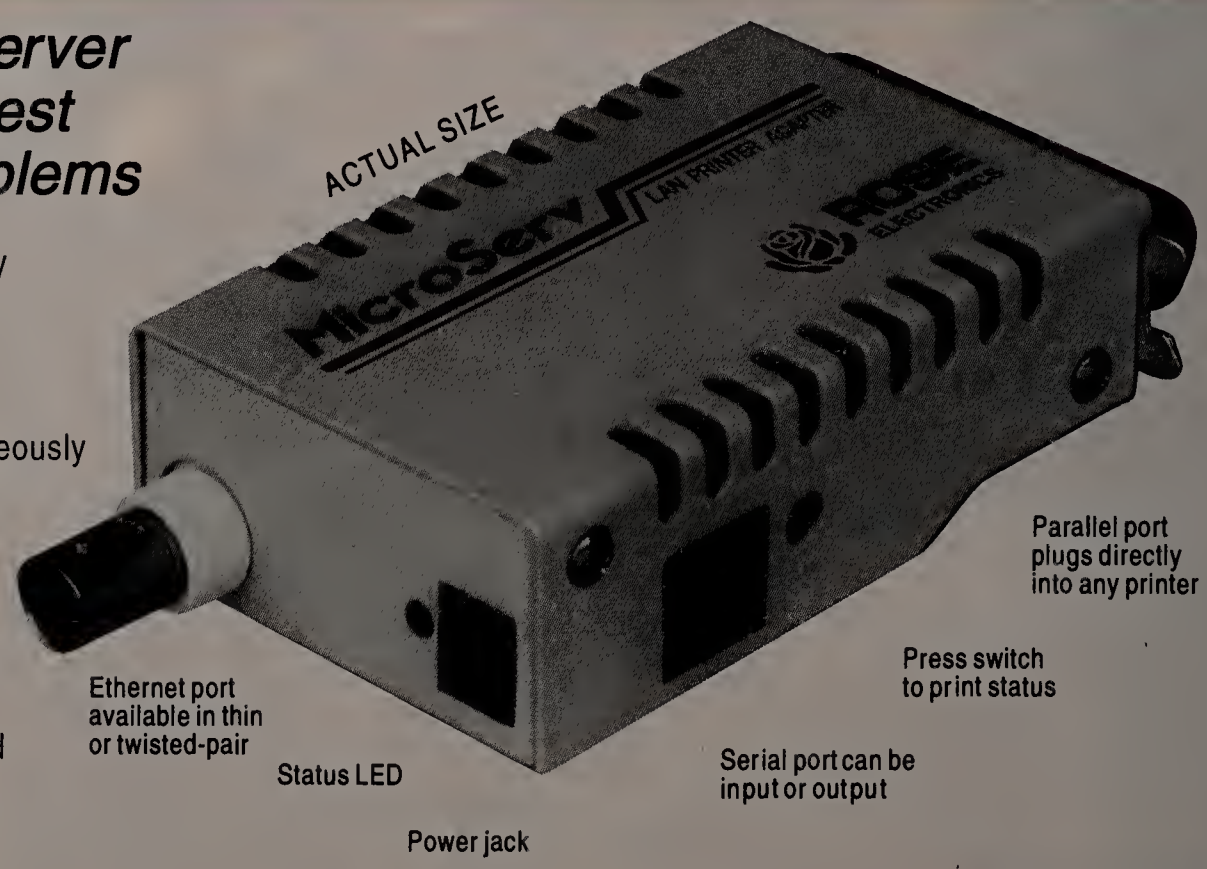

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And the WinBook comes with the power and speed eded to run Windows effectively. You get 4MB of emory, the new ultrafast 486 SLC/E 25-MHz proces- and the Motorola chipset which provides eight wer-saving features, even while running Windows.

The WinBook was engineered for Micro Electronics, division of MEI/Micro Center, Inc. MEI is America's leading direct source for computer accessories. Micro Center has been selling PCs for more than 14 years–longer than IBM or Compaq–with over 736,000 units sold. And with over 2.2 million satisfied customers nationwide, they have developed a superior support staff, including top engineers and technical specialists. So you always get the highest quality product at the lowest possible price.

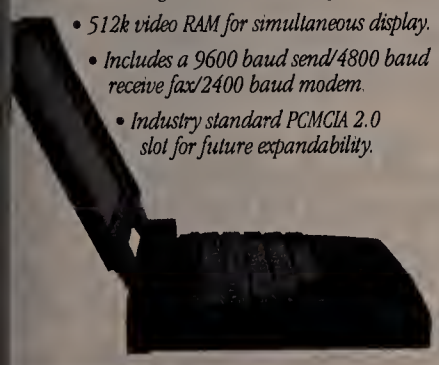
Before you choose a notebook computer, look at the only one designed for Windows.

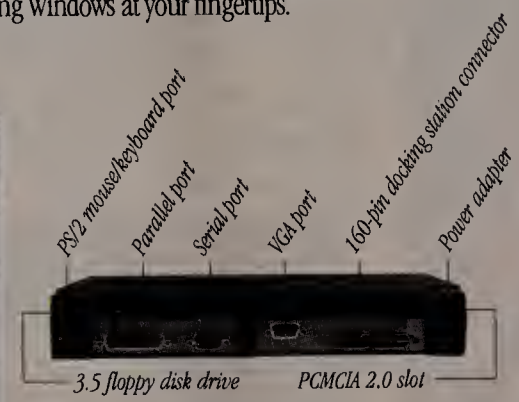
The WinBook from Micro Electronics
—putting Windows at your fingertips.

Dual-button trackball centered under keyboard.

he 5.4 lb. WinBook was designed by ward-winning Palo Alto Design.

- *Fast-acting Hitachi LCD screen for no cursor loss.*
- *512k video RAM for simultaneous display.*
- *Includes a 9600 baud send/4800 baud receive fax/2400 baud modem.*
- *Industry standard PCMCIA 2.0 slot for future expandability.*





ight Power-Saving Features

luding sleep mode for all I/O ports, DD, and FDD to increase battery life.

Longer Battery Life

The WinBook features NiMH 2300 MA batteries with gold-plated contacts. This allows it to run much longer than units with traditional NiCAD batteries— and there's no memory effect.

Warranty

- *45-day unconditional money-back warranty.*
- *24 hour burn-in protection.*
- *One year limited warranty on parts and labor.*

Service

- *72-hour service turnaround guarantee.*

Support

- *Toll-free technical support for the life of the computer.*

Payment Options

Visa, MasterCard, Discover, personal checks, COD's with cashiers check and Purchase Orders with approval.

Prices do not include applicable taxes, handling or shipping charges. Prices and specifications subject to change without notice.

Docking Station

th the available docking station, your WinBook stantly becomes a full-function desktop computer. two expansion slots allow you to add peripherals ch as monitors, hard drives, CD-ROMs or an tended keyboard. **And it's just $399!**

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Specifications

ze/Weight
11" x 8 3/4" x 1 3/4"
5.4 lbs with battery

ointing Device
16mm Alps dual-action, Microsoft compatible internal trackball

attery
4 hours under normal usage
Sanyo NiMH (no memory effect)
2300 MA with gold-plated contacts
Worldwide auto-sensing AC adapter
Quick 2-hour recharge

ower Management
8 power-saving features

Processor & Memory
- 486 SLC/E-25 CPU
- 4 MB RAM
- 1 MB ROM for Ami BIOS
- Motorola chipset & Cirrus VGA 6420
- 1k Internal Cache

Drives
- One built-in 1.44 MB 3.5" floppy drive
- Internal 120 MB (15ms) hard drive
- 250 MB (15ms) hard drive optional

Software
- Comes loaded with MS-DOS 5.0 and Microsoft Windows 3.1

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- Super-twisted 64 gray scale, 10" LCD with CCFT-backlit
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- Full-function keyboard with 85 keys and 4 inverted-T cursor control keys, 3.0 mm keyboard spacing

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- Fax-9600 baud send/4800 baud receive/2400 baud modem

I/O Ports
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Options
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- Coprocessor
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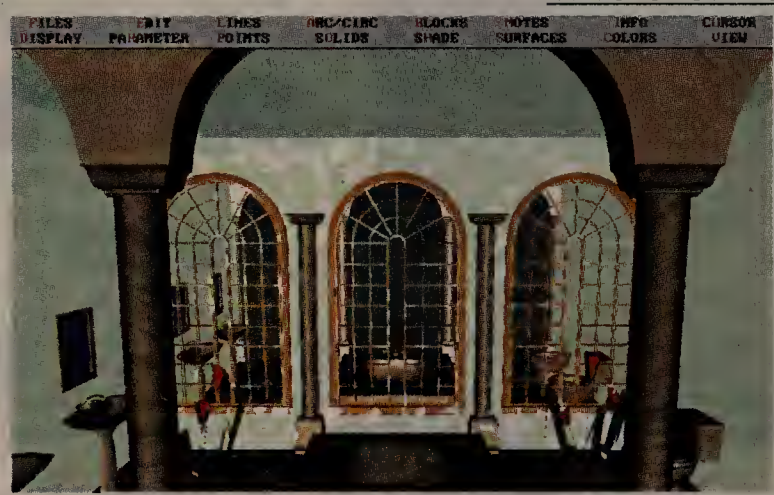
"DesignCAD...is a case study of what can be achieved when a software producer commits to excellence. A great interface, logical commands, and vertical integration into 3D combine with a great price ($349) to make...a superior buy once again." - PC Magazine March 1993.



Typical DesignCAD 3D drawing. Courtesy Old World Graphics, Philadelphia, PA.

DesignCAD Release 6.0 added hundreds of new features and improvements. For this reason, our dealers and distributors felt a price increase was in order. Some complained they made more money selling competing products. It's always been our belief that a computer-aided-design (CAD) system shouldn't cost more than a good word processor. In the finest American Tradition we said, "Aw...What the Heck. Let's see the other guys beat our deal! Let's keep the price low, and sell big quantities."

DesignCAD 2D Still $349 suggested asking price

DesignCAD 2D Release 6 offers an amazing amount of CAD power for the low price. Features such as a built-in programming language and an on-line manual are standard. Distance,bearing, and center-of-gravity measurements are just a few of the advanced calculation capabilities available. DesignCAD 2D is not a low performance CAD system. It's only low priced!

Who Uses DesignCAD?

Studies indicate the average DesignCAD purchaser is a Fortune 1000 company with more than 500 employees and 100 million dollars per year in total sales. However, due to the low price, a large number of DesignCADs are sold to "average" computer users for ordinary projects. DesignCAD gives you the power and sophistication to complete **any** type of project

What Can You Do With DesignCAD?

Anything! Design your own home, porch, or room addition. Landscape your home. Create technical drawings, do cross-stitch needlework patterns, stain glass window designs, model airplane designs, futuristic vehicles, or design small thermonuclear devices (not a recommended use). Design real-life space vehicles, such as the space shuttle. Do all types of space management and facilities designs. DesignCAD eliminates the age-old drafting board.

The uses for DesignCAD 2D are only limited by YOUR imagination!

What about 3D?

We've got it! We offer DesignCAD 3D for only $499. DesignCAD 3D offers power and features not found on systems costing thousands of dollars more.

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In general, DesignCAD 2D is the best choice for all drafting applications. DesignCAD 3D is best used for simulation; to see what something looks like before it's built. If you have questions about which program is best suited to your needs contact our Sales Department.

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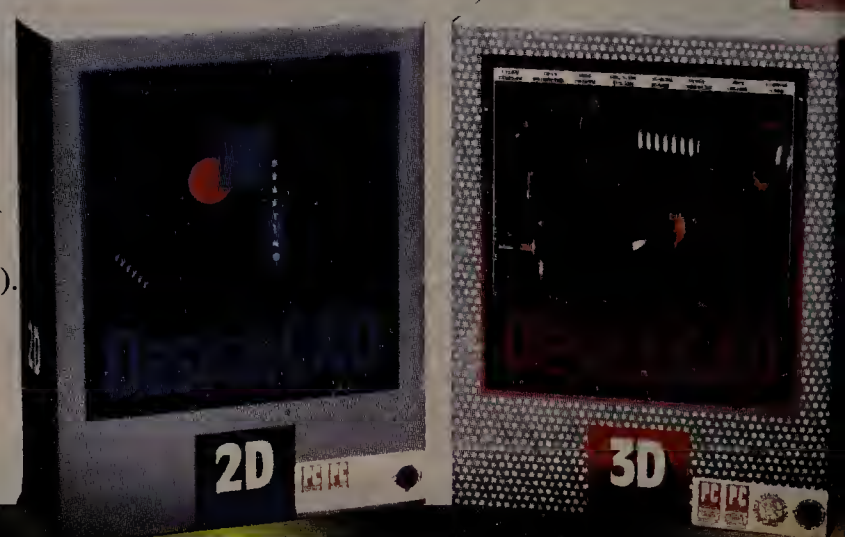

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Circle 1 on reader service card

An Open Letter to Hillary Rodham Clinton

As head of the National Task Force on Healthcare Reform, you are charged with overhauling our nation's health care system. We hope that as part of that task, you will turn your attention to a class of injuries that is disabling thousands of computer users in the United States each year. Called repetitive strain injuries (RSIs), these ailments include everything from tendinitis to carpal tunnel syndrome to tennis elbow. RSIs result when an individual repeats the same task without interruption—in this case, typing at a computer keyboard.

RSI complaints now represent the majority of all work-related injuries reported to the Occupational Safety and Health Administration. These ailments can rob workers of full use of their hands, diminishing their quality of life and costing their employers millions of dollars annually in medical, administrative, and legal expenses. For example, a single case of carpal tunnel syndrome (one of the most common RSIs) left untreated can cost an employer as much as $100,000.

One of the most regrettable aspects of keyboard-related RSIs is, many of them need never occur. Ergonomists and medical experts agree that adjustments to workstation design and regular breaks from typing can go a long way toward reducing the frequency of injury. Critical questions are still being debated, however: What role, if any, has keyboard design played in causing these injuries? And might new keyboard designs alleviate the problem?

The only way to answer those questions is through a well-defined, long-term study of computer keyboard users. No such study is under way or planned, however. Private research institutions don't have the resources, and to date the federal government has not considered it a priority. We encourage the government to reevaluate its position, both out of compassion for those affected and for a very hardheaded economic reason: RSIs are costing the United States billions of dollars a year in medical expenses and lost productivity.

As a first step, your committee should seek the input of medical professionals, companies trying to stem the tide of injuries, and the injured workers themselves. Armed with an understanding of the severity of the problem, you may also have the power to curtail the epidemic. There is no lack of information on RSIs. All that's needed is the commitment—and will—to effect change.

This letter was sent to Clinton in April.

By Roberta Furger

PC World Consumer Watch editor Roberta Furger

Shop Talk

Two Strikes, You're Out

In February of 1991 I purchased a Packard Bell 386SX computer, including a monitor and a printer. In July of that year, my video card malfunctioned and was replaced under warranty. Then in December, my motherboard gave out. After the computer had been at the dealer's for approximately six weeks, the dealer notified me that they would not exchange the system, saying it was a Packard Bell problem. Finally, after much arguing with Packard Bell, I received a new system with a new warranty.

In November of last year, I had to take my *new* system in for repair. It received a new motherboard, a new power source, and a new hard disk, but when I got the system back, it would not work. I spent several hours formatting, partitioning, and then reformatting the hard drive to make it bootable, but I continued to receive error messages. I paid more than $2000 for this system and have lost several days of work because of the problems.

Carol Burnett, Oakdale, Minnesota

Editor's Note: According to Sheryl Kopp, Packard Bell's national customer service manager, Burnett has received a full refund. "Regrettably, both of the Packard Bell systems Burnett purchased exhibited technical problems that arose after various peripherals were added to them. Packard Bell's technical support log indicates that the computers functioned properly without the various add-on items," says Kopp.

The Hidden Cost of a Good Price

I purchased a PC Switchboard Modem/Fax/Voice Mail kit from DAK Industries. It worked fine for almost ten months, but then it started answering calls without playing the outgoing message. Even worse, when the caller hung up, the PC Switchboard would not re-

BUG WATCH

Quattro Pro and Quattro Pro for Windows

Users report and Borland confirms a bug in *Quattro Pro 4.0* and *Quattro Pro for Windows'* @ROUND function that can cause inconsistent rounding of decimals ending with the number 5. The number 31.875 rounded to two decimal places, for example, should always yield 31.88 but is instead sometimes rounded to 31.87.

Although Borland says the problem is more likely to occur on systems lacking a math coprocessor, *PC World* was able to duplicate the problem on coprocessor-equipped systems.

Instead of using the @ROUND function, Borland recommends using the @INT function as shown in the following example.

To round a number in cell A1 to two decimal places, enter @INT((A1+.005)*100)/100.

No fix is available for the bug; Borland plans to repair it in the next major release of both packages.

Borland Int'l
408/461-9122 (Quattro Pro tech support)

PKZIP

PKWare has released maintenance version 2.04e of its popular file compression utility, *PKZIP*. The upgrade to the program includes fixes as well as work-arounds for an assortment of bugs that were present in version 2.04c of the utility.

In particular, bugs affecting multidisk backups and volume labeling have been eliminated, as have incompatibilities with *Norton AntiVirus, NetWare Lite,* and various memory managers.

The upgrade, which includes a complete list of modifications, is available for download on the PKWare BBS.

PKWare
414/354-8699, 414/354-8670 (BBS)

—Richard Melville

Have you run into a software bug or hardware incompatibility? Call us at 415/978-3253 with the details. We'll investigate problems and report on those with the broadest interest.

Richard Melville is an editorial intern for PC World.

lease the phone line, and I was unable to retrieve previously stored messages or play them back.

I tried to contact DAK via its 800 numbers. After two weeks of busy signals on all its lines, I wrote to the company. I tried to locate a telephone number for The Complete PC (maker of the PC Switchboard) in the documentation but could not. I finally got a call from a DAK service representative who told me it was a hardware problem. He said I would have to contact Complete PC and gave me the phone number. Complete PC told me that if I had purchased the product from them directly, the product would have been repaired or replaced at no charge for two years from the date of purchase. But since it was purchased from DAK, I would have to pay $175 to have the board fixed or replaced.

Ted Saari, Pine City, Minnesota

Editor's note: James Reardon of DAK computer support tells us that DAK used to sell the PC Switchboard (manufactured and sold by Complete PC as The Complete Communicator) with a DAK-backed 90-day warranty. The DAK price was as much as $200 less than the price of The Complete Communicator, he adds, noting that the main difference between buying the product from DAK and buying from an authorized dealer was the length of the warranty.

After 90 days, DAK referred customers with hardware problems to Complete PC for service. DAK handled all software-related problems itself. DAK Industries has a 30-day risk-free trial period, says Reardon, who suggests that buyers read the warranty at the time of purchase and return merchandise if they are not fully satisfied with either the warranty coverage or the product.

Free Replacement

I purchase toner cartridges regularly from Willow Products in Pittsburgh, Pennsylvania. Recently, I put a new cartridge (which I had purchased several months before) into my printer. The cartridge malfunctioned, and I thought I would be stuck with a defective unit since it was reconditioned and had cost far less than a new one.

When I called Willow, I discovered my fears were groundless. A knowledgeable person on the phone instructed me to return the cartridge and assured me Willow would send a replacement that very day.

Four days later I had the replacement cartridge, and my printer was up and working once again. I think a company behaving as admirably as this deserves some recognition.

Thomas P. Smith, Mount Dora, Florida

New or Refurbished?

In 1991 I purchased two 40-MHz 386 motherboards from Orchid Technology. From the start, one didn't function properly. I experienced sporadic Unrecoverable Application Errors while running *Windows 3.0*. After suggesting a number of things that didn't fix the problem, Orchid recommended I send the motherboard in for repairs.

About a week after I shipped the motherboard, I got it back, but the problems persisted. I tried various changes to my *Windows* configuration and even upgraded to *Windows 3.1*, but nothing helped. It wasn't until I attempted to install OS/2 that I discovered the cause of the problems. In running the setup for OS/2, the system would freeze up on the second disk. IBM diagnosed the problem as being related to cache memory. With cache memory disabled, the system was stable (though slow).

I informed Orchid of the cache problem, and the company instructed me to return the motherboard for tests. I did, and it came back a week later with an explanation that nothing was found wrong with it. Knowing that the motherboard was the problem, I requested a new one. The manager of customer service agreed.

Upon receiving a replacement, I became suspicious that it wasn't new. It had a serial number within the range of the two I had purchased almost a year earlier. I installed it, however, and was

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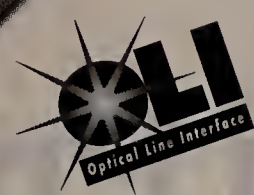

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Comes complete with QuickLink II comm/fax software for DOS and Windows, CompuServe bonus ($22.95 value), user's manual, fax modem phone cord. Mac version available, with Mac cable, reg. price, $585 ..... **now $299.**

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End User Inquiries
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BYTE 9/92

"In the Windows word processing world, Ami Pro 3.0 comes close to being perfect ...It stands above Word and WordPerfect both in its function and in its speed."

Home Office Computing 1/93

Software Digest

RATINGS REPORT®

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Vol.9, #6, September 1992

Advanced Word Processors for Windows	
	Overall Evaluation
1ST Ami Pro 3.0 for Windows	**8.7**
2ND Word for Windows 2.0	8.1
3RD WordPerfect 5.1 for Windows	6.1

"Ami Pro 3.0 takes the le as the Windows wo

If you're still under the impression that Microsoft® Word and WordPerfect® are the top dogs in the word processing arena, we've got news for you.

According to the top reviewers, and people who've tried it, Lotus® Ami Pro® 3.0 is far and away the Windows™ word processor of choice. In fact, it's becoming increasingly clear with each new release, that Lotus is the developer of choice for Windows applications.

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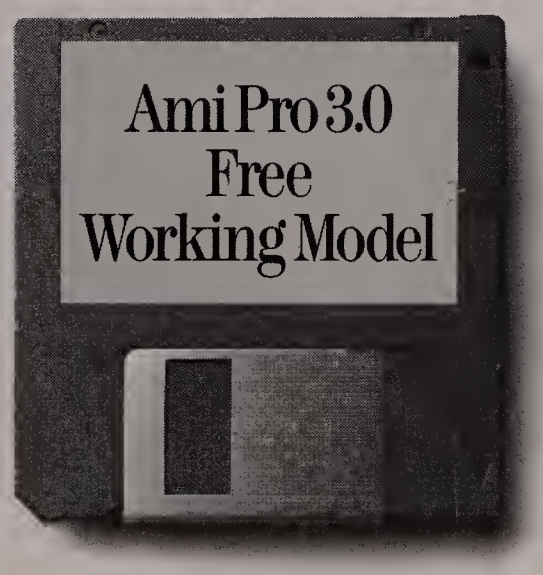

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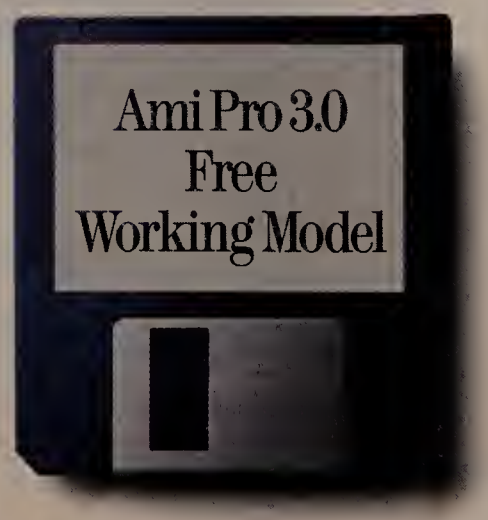

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able to load OS/2. For the first time, I was able to run *Windows 3.1* without problems. But if I left the computer on for more than an hour, the keyboard input would become scrambled, and eventually the keyboard wouldn't work at all. Once again I sent the motherboard in for repairs, and again Orchid sent it back saying nothing was wrong with it. I sent it back once more, and the company sent another replacement. The new one corrected the keyboard problem but had the same cache problem as the first one. The reason for this—to my astonishment—was that Orchid had sent me my original motherboard.

In discussions with an Orchid customer service representative, I learned that Orchid routinely exchanges motherboards with refurbished ones.

Patrick Blair, Seattle

Editor's note: Tim Jones, customer service manager for Orchid, explains that if a product malfunctions while under warranty, Orchid will—at its option—repair or replace it, possibly with a refurbished product. This policy is not spelled out in the documentation. Jones explains that a returned board is run through a series of tests. "If we can't find anything wrong with it, we return it to our inventory of replacement parts," says Jones. "We keep a very small number of each board on hand, so it isn't really that surprising that Mr. Blair got the same one back, although it is a situation we should have avoided."

According to Jones, because the boards in the "replacement buffer" undergo a battery of tests (and are often upgraded along the way), they have a higher reliability rate than new boards.

Still, if you are concerned about getting a refurbished unit, check the warranty. If it doesn't specify, ask.

How Can They Do That?

A letter from Robert Pritchard of Chestnut Ridge, Pennsylvania, sparked our curiosity about the legal ramifications of selling used software. Mr. Pritchard had purchased a secondhand copy of *Peachtree Accounting* from a company called Recycled Software, which buys and sells used software. In his letter, Pritchard asked *Consumer Watch* whether this type of business infringes on

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POWER TIP no. 278

WinWord Speller Editing

If you've mistakenly added an undesirable word to your *Word for Windows* custom dictionary, all is not lost. *WinWord's* supplementary dictionary files—which have the extension DIC—are straight ASCII files that can be edited with *WinWord* or with Notepad. Simply bring up the file, make the changes, and then save it again. If you don't know where your dictionary file is located and what it's called, it's probably C:\WINDOWS\MSAPPS\PROOF\CUSTOM.DIC.

Kathleen Burman
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Circle 16 on reader service card

copyright laws. We wondered too, so we decided to do a little investigating. Here's what we discovered:

According to Diane Hathaway of Recycled Software, many license agreements do not prohibit the transfer of a license from one person to another as long as the original disks and all manuals are included in the transfer and any copies of the program are destroyed. Recycled Software assured us that their policy is to sell only software with license agreements that permit transfer, though they admit they made a mistake by selling *Peachtree Accounting*. According to Hathaway, Peachtree's license agreement contains a clause that prohibits transfer, which Recycled Software missed.

For further clarification, we contacted the Software Publishers Association, the piracy police of the software industry. A spokesperson there emphasized that while it may be legal to transfer the license agreement from one person to another, the original owner must destroy all of his or her copies of the software. The SPA spokesperson also emphasized that it is not legal to upgrade to a newer version of a program and sell the old version.

The SPA representative suggested it is Recycled Software's responsibility to ensure that sellers are removing the software from their hard disks and are destroying all extra copies of the software packages. Hathaway, however, says the firm cannot police the activities of software owners, adding that it is the responsibility of the seller to abide by all software license agreements.

If you plan to purchase used software, remember that the original owner will probably have submitted the registration cards, so they won't be in the package. You may be giving up the right to the warranty, technical support, and upgrades.

Research assistance provided by PC World *assistant editors Michael Desmond and Christina Wood.*

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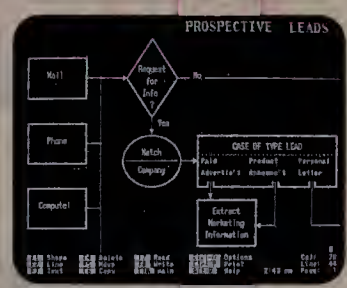

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Abbreviated Searches in cc:Mail

When I have a crowded *cc:Mail* in-box and want to find a message in a hurry, I don't like to wait while *cc:Mail* searches the whole in-box by person, date, or another criterion. So if I know the message is among the first 30 messages that match the criterion, I start the search and watch the counter of messages searched. As soon as *cc:Mail* has searched 30 messages, I press <Esc>, which stops the search, and then press H to look at the message headings. In the abbreviated list, it's easy to find the message I'm looking for.

Rex Farrance
Associate Editor

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Circle 132 on reader service card

Fighting Back Against Viruses

How would you respond to a computer virus attack? Linda Dienberg, a network administrator for the Deerfield, Illinois–based pharmaceutical company Fujisawa, USA, faced just that question when her company's LAN was invaded by not one but two computer viruses. Dienberg, who characterizes the infestation as "a good learning experience," oversees approximately 150 users of *WordPerfect*, *1-2-3*, and a vast *Paradox* database containing data about clinical drug studies. —*Ed.*

It Came From the Deep

A caterpillar crawling across the screen may sound cute, but in our case it signaled an invasion. About a year ago we were struck by two viruses at the same time—the relatively benign caterpillar, and a nastier virus that changed a file's dates to the current day and corrupted program files whenever users copied a file or executed a DIR command. Our two viruses infected 20 systems right away through the network NLOGIN.EXE file.

To keep the disaster from growing, we—our network specialist, a consultant, our MIS manager, and I—had to act quickly. Fortunately, when the viruses struck, we were already in the process of evaluating several antivirus packages. We scanned each PC with an antivirus program, cleaned infected files, reinstalled them from backups (after making sure the backups were not infected), and then protected the remaining files. No one's computer was down for more than an hour or two, but it was quite a job.

With the immediate problem resolved, we set about instituting a comprehensive program to protect ourselves from future invasions. To have an unbreachable system, we knew we'd need to install antivirus software in memory on every single machine. We also knew we couldn't afford that luxury. Many of our systems are 286s using 1MB of memory or less, and users sometimes run into memory roadblocks when they want to use *1-2-3* or load drivers to connect with our AS/400 minicomputer.

So we opted for a four-step prevention regimen. First, we set up a workstation that's exclusively for scanning disks brought in from outside the office. Usually the disks are clean, but we have intercepted a few viruses.

Second, every night we use *Central Point Anti-Virus* to scan executable files on our five servers automatically, and we scan all the files on our servers every other week. The full scan takes anywhere from 10 minutes to 5 hours, depending on how much data is on the server. We also joined Central Point Software's subscription program, which allows us to get an update on new virus signatures and program features every quarter. We can download them from the company's BBS more regularly if a newsworthy virus is making the rounds. (We eventually settled on *Central Point Anti-Virus*. It proved effective, plus the Central Point tech staff gave us excellent phone support during our crisis. If you're considering antivirus software, you can't be too picky about support.)

Whenever our scan finds an infected file, we clean it, delete it, and replace it from a good backup. Our biweekly scanning program won't catch every virus, but it's a viable strategy against viruses like Michelangelo, which are time bombs.

Third, we've protected our PCs by making all the program files in the root directories read-only using the DOS ATTRIB command. We have done the same to most of the executable and DOS files on the network. Read-only files are less likely to be affected by a virus. Few, if any viruses change read-only files to read-write status. Of course, sometimes users have to change an AUTOEXEC.BAT or CONFIG.SYS file. The danger is, they will forget to make it read-only again.

Linda Dienberg of Fujisawa helped set up a four-step virus prevention regimen.

MICHAEL ABRAMSON

To counter that sort of oversight, we began step four, an extensive education campaign. We issued bulletins to our users explaining the most common ways that viruses are transmitted. People often don't understand the first thing about them. I've gotten questions such as, "Where do they come from?" and "Could I accidentally write a virus?" Most people are genuinely surprised that people write viruses purposely to do mischief.

We've issued other bulletins asking users to take the following precautions: Use only shrink-wrapped software; always scan "outside" disks for viruses

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PCW 5/93

Circle 212 on reader service card

before using them; avoid downloading programs from BBS's that don't virus-check their software; make sure shareware comes from a reputable source; and put write-protect tabs on all disks so they don't pick up a virus inadvertently. We also recommend keeping a backup copy of files not stored on the network so if those files get infected, users can copy over a clean version.

Some companies are so serious about virus protection that they have a drastic policy: Bringing in a virus is grounds for termination. We're not as stringent here. We want our employees to be concerned about the integrity of their data, but we don't want to make the working environment repressive. Our system is far from foolproof, but it's very workable, and we're a lot safer now than we were last year.

If you use PCs to manage people and other resources in a business environment, we want to hear from you. Send your article idea—including a brief outline of your company, job, problem, and solution as well as your name, address, and phone number—to Real Problems, Real Solutions, PC World, *501 Second St. #600, San Francisco, CA 94107; or send it electronically to Real Problems, Real Solutions on PC World Online; or 415/442-1891 (fax); or call us at 415/978-3224. We pay $300 per published column. Sorry, we cannot acknowledge unpublished materials.*

POWER TIP no. 280

A PATH at Your Disposal

When you have to change your PATH setting for some quick operation or another, how do you get the original back? Rekeying the original PATH setting is clumsy and error prone, and rebooting is slow. Instead, save your PATH setting to disk. Before changing the setting, type PATH > SPATH.BAT at the DOS prompt. This command produces the file SPATH.BAT, which can restore your original PATH setting. When you want your original PATH list back, return to the directory you ran the first command in and run the command SPATH.

L. Fred File
Washington, DC

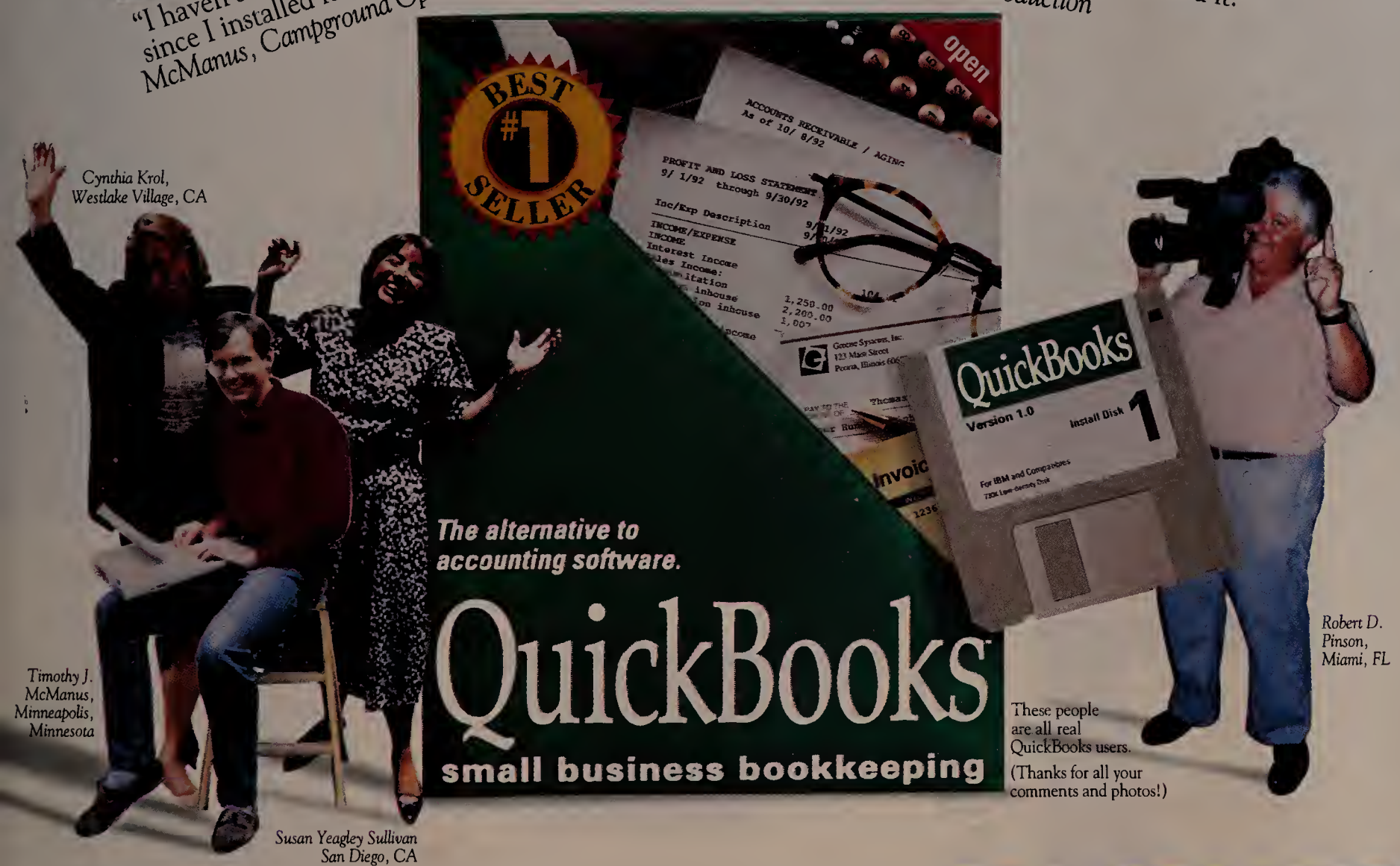
"Hallelujah!" "Love it!" "Easy!" "Unlimited!"

"QuickBooks is simple to understand and use." *Cynthia Krol, Accounting*

"Reports can be laid out in any conceivable way." *Susan Yeagley Sullivan, Psychiatric Management*

"I haven't used the manual since I installed it." *Timothy J. McManus, Campground Operator*

"Unlimited free technical support. Not that you'll need it." *Robert D. Pinson, TV Production*



Cynthia Krol, Westlake Village, CA

Timothy J. McManus, Minneapolis, Minnesota

Susan Yeagley Sullivan San Diego, CA

Robert D. Pinson, Miami, FL

These people are all real QuickBooks users. (Thanks for all your comments and photos!)

Why is QuickBooks #1? Word of Mouth. It's the #1 selling bookkeeping software for small business people. It's the #1 recommendation from retailers. And most importantly, it's #1 with users.

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"Extraordinarily easy to use, yet provides plenty of accounting power." PC Magazine

"QuickBooks is the easiest." New York Times

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If you can't tell the differ
maybe you shouldn't p

Laser Printer

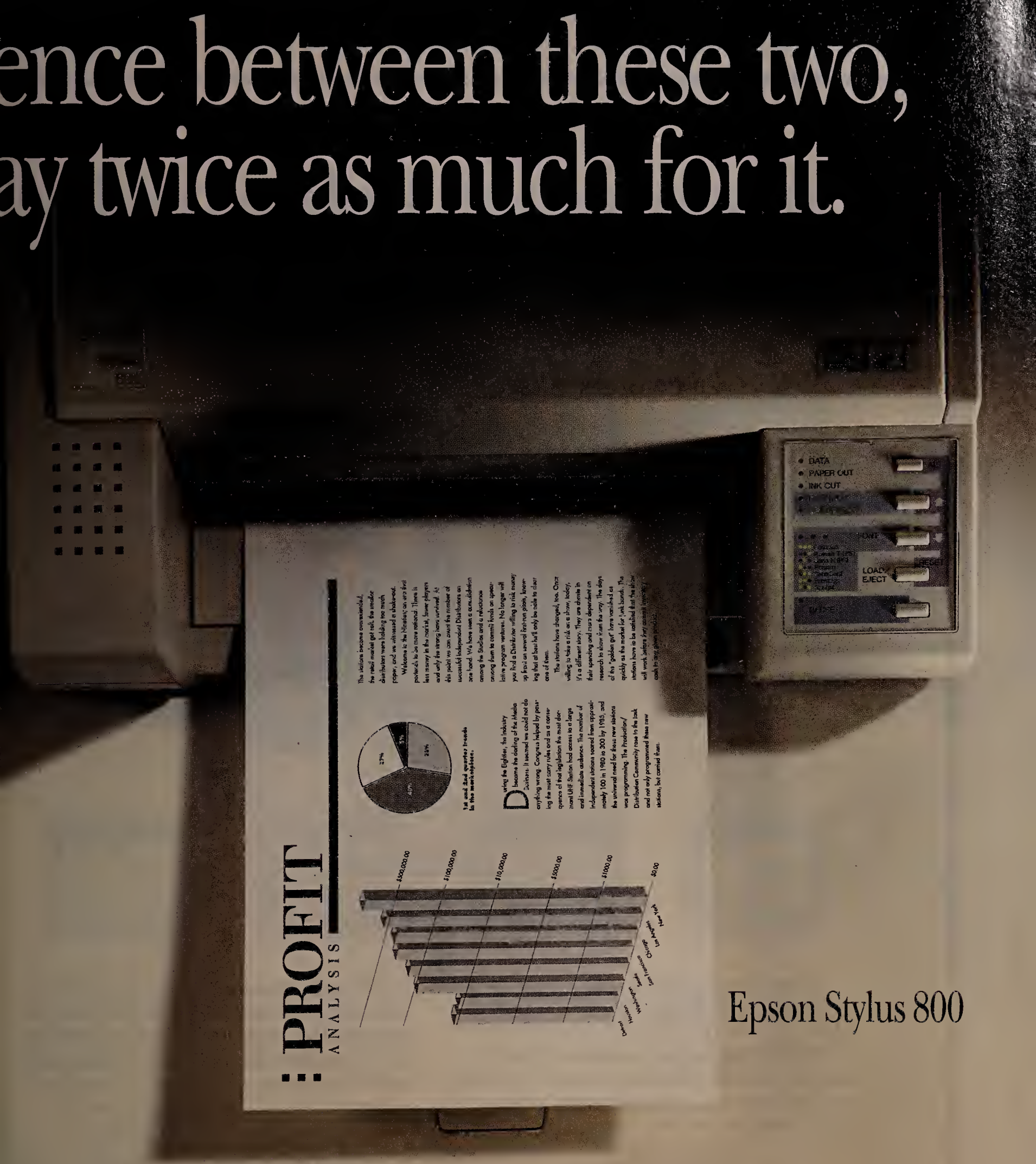
OK, concentrate. Look carefully at the page on the left. It comes from a laser printer. Notice how clear and sharp the text and graphics are.

Now, examine the one on the right. Printed by the Epson Stylus™ 800 Ink Jet Printer, which costs about half as much as the laser printer on this page.

No, there's nothing wrong with your eyes. The new Epson Stylus 800 is the right answer if you'd like the look of laser without paying the price.

It's whisper-quiet, compact, Windows® compatible, and fast: it prints at 150 cps.

ence between these two, ay twice as much for it.



Epson Stylus 800

Plus, scalable fonts are standard. All making it the perfect printer for a small business or home office.

Epson's Stylus 800 is also the most solid, durable, reliable ink jet printer ever made. As you'd expect from Epson. Plus, we support you with our toll-free Epson Connection customer service hotline.

But don't believe everything you see in print. Visit your Epson dealer, or phone the Epson Connection and ask us to send you a free print sample. Call us at 800-289-3776.

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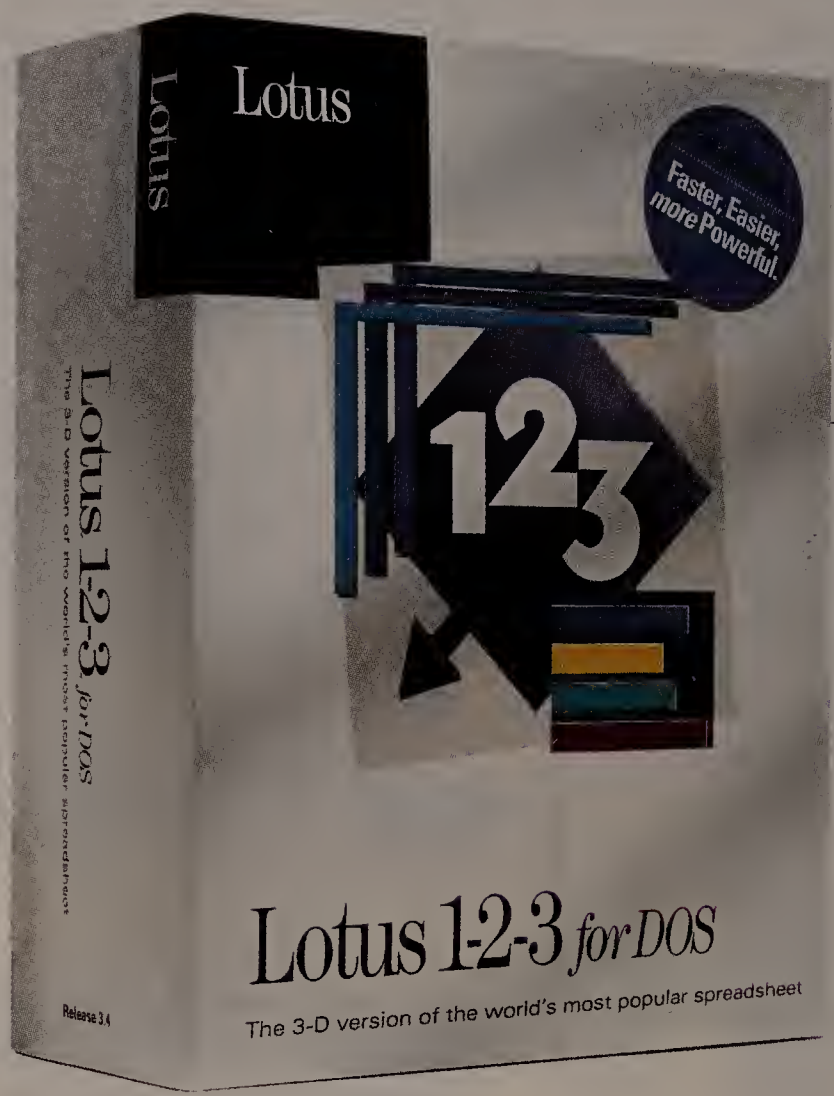
Lotus 1-2-3 Release 3.4. Install it once and for all.



Introducing the network-ready version of 1-2-3 for DOS Release 3.4.

Now the most popular spreadsheet for DOS is also the best one to install and use on networks. Because it gives you more ways to share the power of 1-2-3® with other users.

In fact, one package does it all.

You can load 1-2-3 Release 3.4 onto your server and then download it to all the PCs on your network. Or load it onto your server and let users access it as needed. Or use it as a stand-alone application. It's all up to you.

Of course, the network-ready version of 1-2-3 Release 3.4 has all the features important to network users. Like multiple levels of security for protecting sensitive business documents. And a unique File Reservation feature that lets just one user at a time change a file, but still allows others to view it.

The ultimate spreadsheet for DOS users everywhere.

This network-ready version comes with all of the latest and greatest features of 1-2-3 Release 3.4 for DOS. Such as SmartIcons™ for single-click spreadsheet short-

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cuts, exclusive, true 3D capabilities for organizing and consolidating data, DataLens® for tapping into external databases, and file linking for building on data from other files. And let's not forget speed, since 1-2-3 Release 3.4 truly leaves the competition in the dust.

A license to save.

If you like economy and simplicity, you'll love this. Instead of buying individual software packages for everyone on the network, all you need now is a license pack for each user. So you save money by buying only the licenses you need. And with the Count Utility, adding new users, administering networks and tracking software usage is a breeze.

To find out more, just visit the Lotus® Authorized Reseller near you. Or call **1-800-TRADEUP, ext. 8612*** for a free demo disk, or to order your upgrade directly from Lotus.

And see why what's good for one user is even better for all.

Lotus 1-2-3 Release 3.4
Spreadsheet for DOS

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LINE FORMS FOR NEW

Upgradable processors and innovative security features join the list of enhancements to IBM's ValuePoint line. You'll also find a roomy tower and diskless LAN workstations.

TEST DRIVE

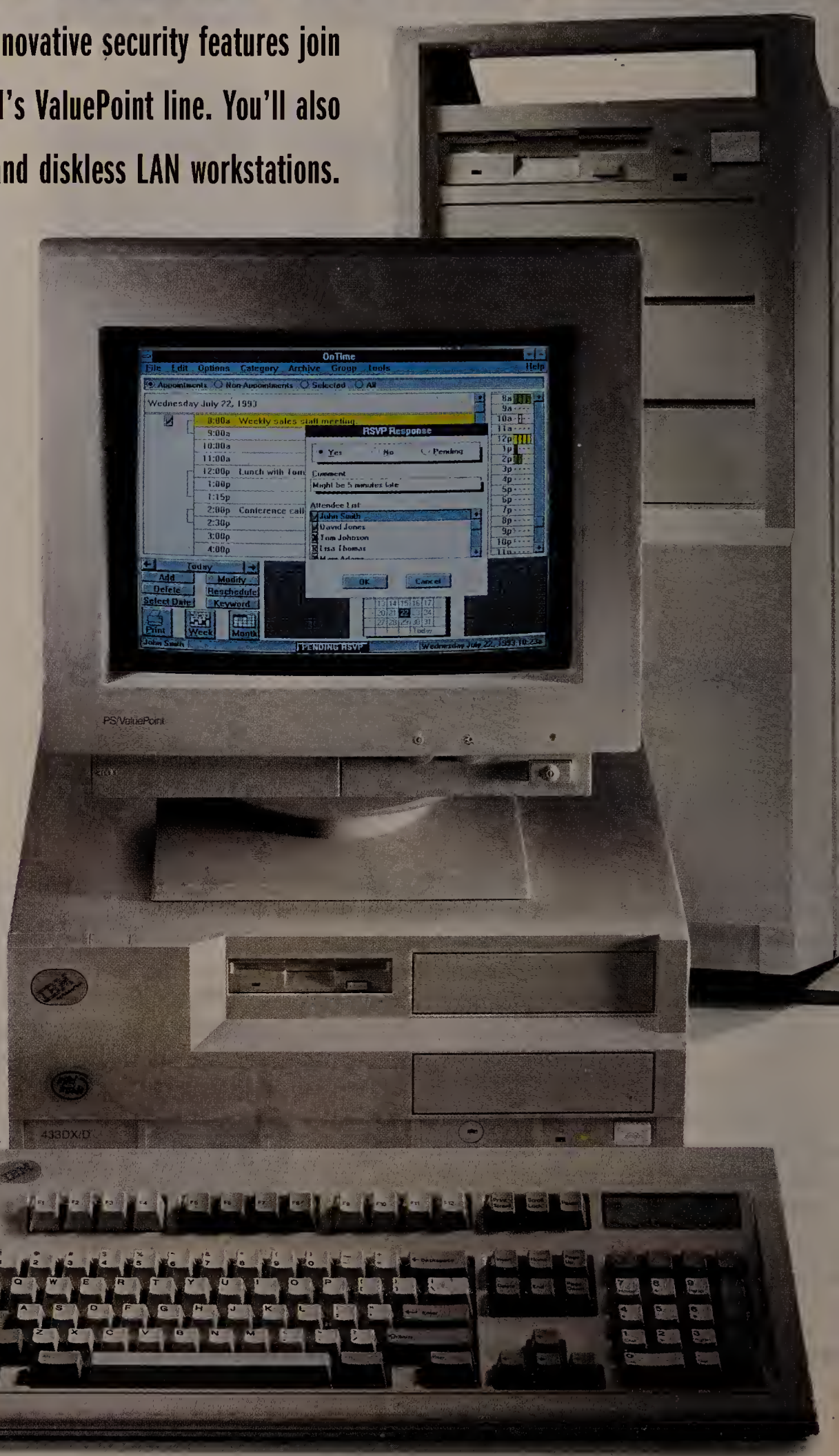
Bargain PCs from IBM? An oxymoron. PCs with all the current checklist items? Nonexistent.

That's all changed.

In its continuing bid to catch the PC tiger and regain a competitive advantage that pays off for buyers, IBM is introducing a new series of PS/ValuePoint systems—40 in all—including new diskless and minitower systems. All these new ValuePoints have local bus graphics, upgradable processors, and impressive security features.

With 40 flavors to pick from, it's no surprise that IBM's second generation ValuePoint line—first introduced last fall—includes a variety of shapes and sizes. The systems are built around three basic configurations. The Model 6384, which replaces the original ValuePoint desktop, has five slots and five drive bays. The new Model 6387 minitower, with eight slots and six bays, is targeted at the low-end server market, particularly businesses that need an inexpensive work-group server. A variety of 486 processors, from 25-MHz SX to 66-MHz DX2, are available for each model.

The Model 6382 diskless workstations, which ship sans floppy or hard drive, are targeted at Big Blue's large corporate clients who need inexpensive network worksta-



IBM BRINGS LOCAL BUS VIDEO and upgradable processors to its ValuePoints. The new lineup includes enhanced desktops, new towers, and diskless workstations (not shown).

Edited by Russell Glitman

VALUEPOINTS

tions. While these compact desktops may conjure up images of the diskless terminals of IBM's glorious mainframe past, each Model 6382 comes with three slots and three drive bays, so users can add floppy, tape, or hard drives later. Each Model 6382 also comes with an ethernet or Token-Ring LAN adapter in an ISA bus slot, leaving two slots free.

Local Bus Graphics and More

Local bus video is no longer a luxury to most buyers; it's now a checklist item. AST, Compaq, and Dell recently introduced proprietary local bus systems. Now it's IBM's turn.

Rather than develop a proprietary local bus scheme, IBM chose the industry standard VESA (VL bus) technology used by Gateway 2000, Zeos Int'l, and other vendors. Integrating both the VL bus and the S3 805 graphics accelerator chip on the ValuePoint motherboard, the new graphics subsystem operates at system clock speed.

In our *Windows 3.1* benchmark suite, a preproduction IBM ValuePoint 433DX/D ran our *Freelance* and *Paradox* tests 14 percent faster than the average 33-MHz 486DX systems with ISA-based video. It was 12 percent faster on *Word for Windows* and *Excel* tests.

Each PS/ValuePoint includes a VL bus slot for another peripheral, such as a network or SCSI adapter, that could benefit from a 32-bit, high-speed bus.

The ValuePoint line comes standard with 1MB of video DRAM (expandable to 2MB) and can display up to 256 colors in 1280 by 1024 resolution at 60 Hz in noninterlaced mode. While most business applications don't require such high resolution, engineering and scientific apps do—a new market IBM hopes to reach with its revamped line, says José Garcia, IBM PC Company's director of PS/ValuePoint.

Speaking of graphics-intensive applications, IBM is also introducing a new 17-inch color monitor with .28 dot pitch. The Model 6317 noninterlaced monitor displays images in 1280 by 1024 resolution at 60 Hz, and in 1024 by 768 resolution at 72 Hz.

Upgradable Processor

Another must for today's PC is an upgradable processor, and the ValuePoint meets that criterion too. Featuring a zero insertion force (ZIF) socket that makes replacing the CPU as easy as flicking a lever and swapping chips, the ValuePoint is upgradable to an OverDrive—or to Intel's next-generation OverDrive processor based on Pentium technology (scheduled for release in 1994).

The latest generation of ValuePoints further illustrates Big Blue's new commitment to the frugal majority of PC buyers.

IBM plans to offer a 128K secondary cache standard with its DX2-66 ValuePoint, with a 256K cache optional. A secondary cache will be optional for the other members of the ValuePoint family.

Better Security

Okay, everybody's got local bus and upgradable processors. So how else does Big Blue differentiate its new low-end systems? Try innovative security features that are sure to please IBM's corporate customers looking for an inexpensive way to secure their data.

New security enhancements let you prevent writes to floppy disks. In addition, you can disable the I/O functions of the serial and parallel ports—useful in preventing data transmission through an external modem, for example.

You can establish a password to prevent others from booting the system and gaining access to your PC's configuration program.

News Monitor

PLUG AND PLAY ISA BUS: At the recent Windows Hardware Engineering Conference, officials from Intel and Microsoft proposed a new Plug and Play ISA bus design. The Plug and Play ISA bus will let users plug new expansion cards into their systems without worrying about IRQs, DMA channels, or similar specs. If future cards, operating systems, and system BIOS's comply with the Plug and Play spec, systems will configure themselves on start-up without any user input.

Plug and Play cards, which will be backward-compatible with existing systems and OS's, should be available by year-end with little if any price premium over existing cards. *Windows 4.0*, due in 1994, will comply with the spec, and several companies, including AMD, Compaq, Intel, Micronics, National Semiconductor, and Phoenix Technologies, have declared support.

RECEIVE FAXES ANYWHERE: You've got a fax-modem in your notebook, but on the road you still have to wait by the hotel's fax machine to receive faxes. This summer Delrina Technology will ship upgrades of *WinFax Pro* and *WinFax Lite* fax software that let business travelers call a toll-free number and download faxes automatically from a Rochester Telephone "fax mailbox." The software will also update *WinFax* send-and-receive logs. The service is expected to start at about $10 per month for 10 minutes of fax reception (about 20 pages), says Delrina product manager Margaret Vaillancourt.

(continued on page 53)

Continued from page 51

(Warning: If you forget your password, you will have to open the computer and flip a jumper to erase it.) In addition, a keyboard password can lock your keyboard while the system is on, preventing others from accessing your data when you're away from your desk getting coffee or in a meeting. A case lock is also standard, IBM says.

Solid Support

Quality service is the newest battlefield in the PC price war, and IBM's offerings here are very competitive. If you buy direct from IBM (via the company's toll-free number), you'll get a 4-hour average response time during business hours, according to IBM. However, if you buy an IBM ValuePoint through a dealer, IBM won't guarantee a response time.

Although exact pricing wasn't available at press time, IBM officials say the new ValuePoints will cost roughly $100 to $200 more than their predecessors. (As a point of reference, the original PS/ValuePoint 433DX with a 33-MHz 486DX processor, 8MB of RAM, a 120MB hard drive, and super-VGA monitor cost $1999.)

With the introduction of its first generation of ValuePoint systems last year, IBM showed that it was serious about aggressively pursuing the small business and home PC buyers it had so long ignored. This latest generation of ValuePoints, with prices and features that compare favorably with systems from IBM's competitors, further illustrates Big Blue's new commitment to the frugal majority of PC buyers.

—Jeff Bertolucci

IBM PS/ValuePoints

Three new 486 series with VESA local bus video and an open VESA slot, an S3 805 graphics accelerator chip on the motherboard with up to 1280 by 1024 resolution, upgradable processors, a 128K secondary cache on DX2-66 models, and enhanced password protection.
Pricing: Approximately $1000 to $4000
Availability: immediate
IBM
800/772-2227

Model 6382 diskless LAN workstation
Key Features: Small footprint design • three slots, three bays

Model 6384 desktop model
Key Features: 120MB, 245MB, or 340MB hard drive • five slots, five bays

Model 6387 minitower LAN server
Key Features: 340MB or 527MB hard drive • eight slots, six bays

Compaq Puts ProLineas on the Local Bus, Cuts Prices, Goes Direct

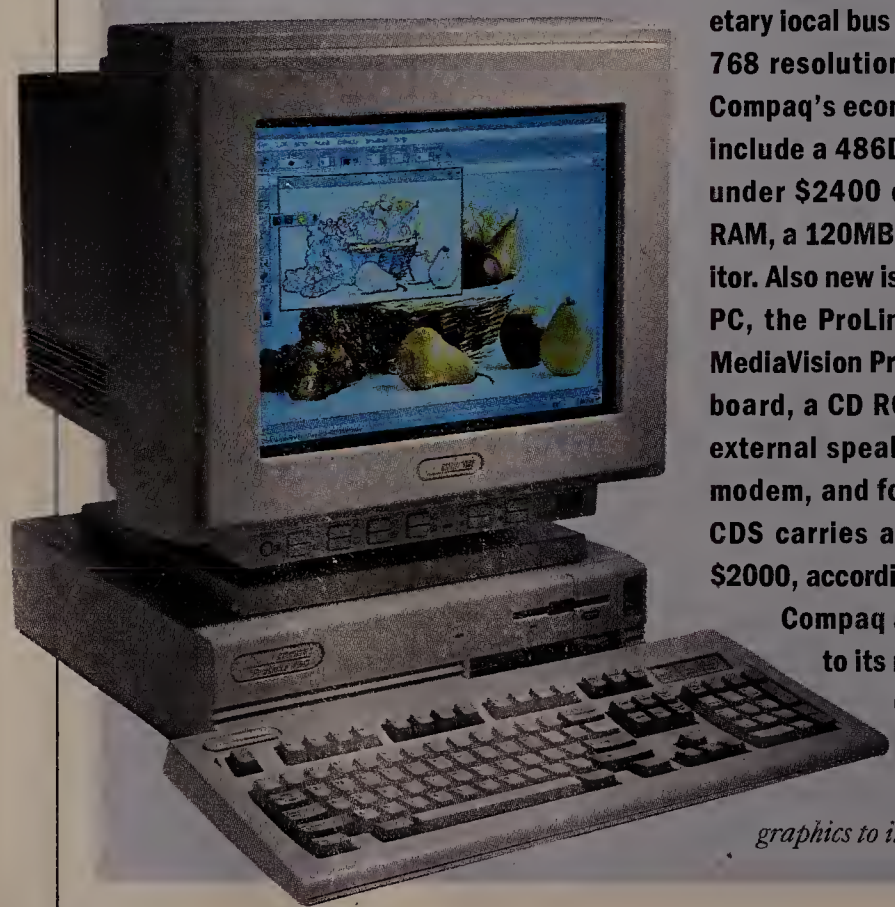
Once again, Compaq has raised the stakes in the PC price war—or as the vendor likes to call it, the value equation—by both cutting prices and adding features. That's good news for buyers, but it's bad news for the smaller clone makers already suffering from razor-thin margins.

Like other major vendors such as Dell and AST Research, Compaq is upgrading its entry-level 486 ProLinea line with proprietary local bus graphics that offer 1024 by 768 resolution. The newest members of Compaq's economy-class ProLinea family include a 486DX2-66 model, which costs under $2400 on the street with 4MB of RAM, a 120MB hard drive, and a color monitor. Also new is Compaq's first multimedia PC, the ProLinea CDS. Equipped with a MediaVision Pro Audio Spectrum 16 sound board, a CD ROM drive, a color monitor, external speakers, a microphone, a fax-modem, and four CD titles, the ProLinea CDS carries a street price of less than $2000, according to Compaq.

Compaq also added three Conturas to its notebook lineup. The latest Conturas feature Intel's power-saving, 25-MHz 486SL processor, 4MB of RAM (expandable to 20MB), and a 120MB or 209MB hard drive. The Contura 4/25CX has an active-matrix color display, an integrated trackball, and a street price under $3300. The Contura 4/25c costs under $2700; it features an enhanced passive-matrix color display, which falls a tad short of active-matrix quality, and a clip-on pointing device. The Contura 4/25 with a monochrome display is under $2000.

Prices on existing products have been cut as well—up to 15 percent on desktops and 9 percent on notebooks. For example, the Contura 3/25c, a passive-matrix color note with a 25-MHz 386SL processor, now costs less than $2000 on the street.

Learning a few tricks from direct marketers Dell and Gateway 2000, Compaq has set up a toll-free telephone business to sell PCs and application software directly. Compaq also plans to distribute product catalogs and mailers to businesses. Compaq Computer Corp.; 800/345-1518, 713/378-8820. Reader service no. 737



COMPAQ ADDS local bus graphics to its entry-level ProLinea family.

Speedy 600-dpi Printing

TEST DRIVE Hewlett-Packard is relentless. No sooner had it launched its LaserJet IIISi—which has defined work-group printing during the past two years—than it started work on a pair of network printers that raise the feature/functionality bar while simultaneously lowering prices.

HP's LaserJet 4Si and PostScript-equipped 4Si MX set a new standard in LAN printers, with 600-dpi resolution, more-precise character formation, improved paper handling, and a multitude of network conveniences.

These 17-ppm workhorses appear identical, but the MX has 10MB of memory, PostScript Level 2, and both HP's JetDirect ethernet and Apple LocalTalk interfaces for $5499, $1750 above the 4Si's $3749. The 4Si MX is for larger work groups with mixed environments or for those pumping out more and/or more-complex documents. A 4Si is upgradable to a 4Si MX: It accepts the same industry-standard SIMMs and is equipped with two modular-I/O slots for JetDirect interfaces.

Available in either ethernet or token ring protocols, JetDirect interfaces automatically sense and switch among ten built-in network OS's—including NetWare, *LAN Manager*, and both *Windows for Workgroups* and Windows NT. Similarly, the printers themselves switch automatically between enhanced PCL 5 and PostScript and their parallel and LocalTalk ports.

But this family's trademark is high-resolution printing without the usual speed penalty. Both printers sport Intel's powerful 25-MHz 80960CF RISC engine and a new HP printing ASIC that combines data compression with the new Enhanced PCL 5. You get faster graphics printing and can mix Intellifont and *Windows* TrueType typefaces at 600 dpi without a performance hit. HP's 150K-per-second bidirectional Bi-Tronics parallel port helps. Add buffered formatting of a second page while a prior one prints, and you should enjoy PCL 5 or PostScript printing at or near the 4Si's 17-ppm engine speed.

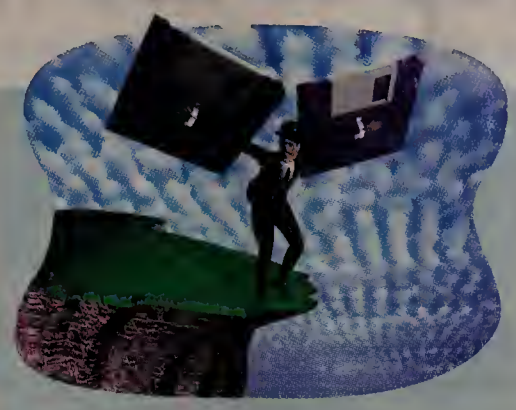
HP'S LASERJET 4Si offers fast, high-res network printing.

Hewlett-Packard's Resolution Enhancement Technology combines with a new microfine toner to yield smaller dots for sharper edges, finer lines, smoother curves, and blacker blacks in both text and graphics.

—Mike Hogan

HP 4Si, 4Si MX

Fast, flexible network printers
Key Features: 17-ppm speed • 600-dpi printing • PostScript Level 2 on 4Si MX • Network OS protocol support on 4Si MX
Availability: Immediate
Pricing: LaserJet 4Si $3749, LaserJet 4Si MX $5499; JetDirect cards $449 to $699
Hewlett-Packard Co., 800/752-0900
Reader service no. 738



News Monitor

(continued from page 51)

WORDPERFECT 6.0 FOR DOS IN BETA: The next release of *WordPerfect* is due in late spring, and its beta is rich in new features, including a *Windows*-like WYSIWYG graphics mode. You'll be able to view nine documents at once in resizable, movable windows; cut and paste between windows; and use four types of scalable fonts, including TrueType and Bitstream Speedo fonts. From *WordPerfect* version 6.0, you will be able to fax and E-mail documents, access and embed sound files, and create hypertext links.

An extremely quick indexing feature will be available, and you will be able to link text in your document to specific cells in the new built-in spreadsheet. Should you stumble on a feature, one of *WordPerfect's* numerous built-in "coaches" will walk you step-by-step through the problem area. Upgrade pricing is expected to be $129.

PENTIUM ANNOUNCED; ALPHA IS SECOND-SOURCED: Intel unveiled its next-generation Pentium processor, which should find its way into high-end desktops and servers from IBM, Compaq, AST, NEC, Dell, and others late this spring. However, Intel officials caution buyers not to expect a flood of Pentium-based systems this year, citing limited chip availability.

Meanwhile, Digital Equipment Corporation says its Pentium alternative, the Alpha AXP, will be manufactured and sold by Mitsubishi—giving systems vendors a second source and insuring competitive pricing for Alpha chips.

(continued on page 55)

Norton 7.0 Enhances DOS 6

TEST DRIVE

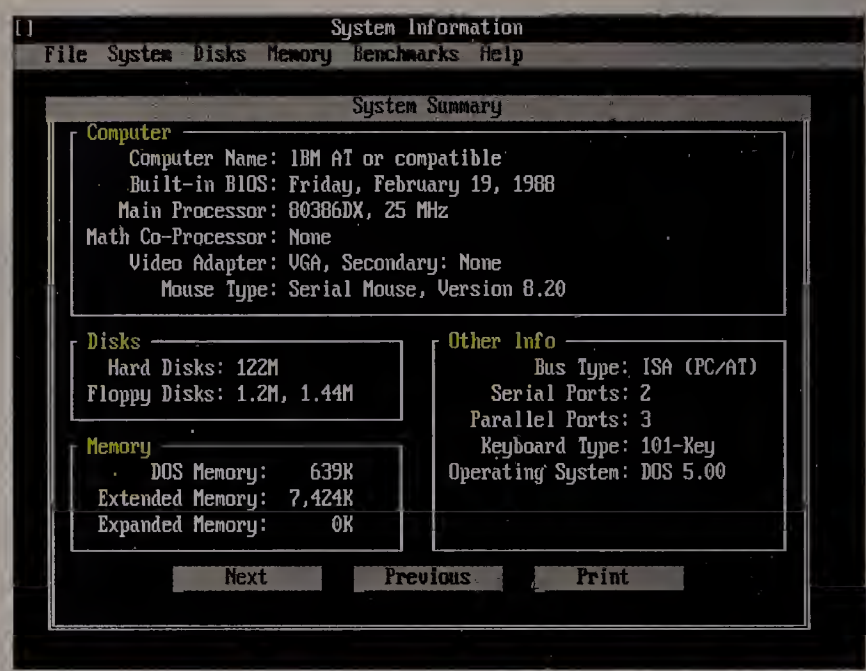
When your PC utility does just about everything except tidy up your desk and brew your coffee, dramatic improvements are hard to come by. Case in point: Symantec Corporation's *Norton Utilities 7.0*, which adds a few major enhancements such as DOS 6.0 compatibility and hardware diagnostics but is still more of an evolutionary upgrade than a revolutionary change.

This doesn't mean *Norton Utilities* isn't worthwhile. A repeat *PC World* Best Buy winner, this feature-packed program offers such a wide range of well-designed, powerful utilities that it's hard not to recommend it to computer novices and veterans alike.

DOS 6.0 Support

While Microsoft's new DOS 6.0 includes scaled-down versions of several helpful utilities such as Central Point Software's *Anti-Virus*, Symantec's *Norton Backup*, and Speed Disk optimizer (part of *Norton Utilities*), the advanced feature set of *Norton Utilities 7.0* should appeal to users who want more-sophisticated memory- and disk-management tools. Plus the new version has the usual *Norton* assortment of system enhancement and data recovery features.

But the big news is *Norton 7.0*'s support for the data compression formats of DOS 6.0, *Stacker*, and *SuperStor*. *Norton*'s Speed Disk can optimize fragmented drives in these compressed formats, improving disk performance and simplifying data recovery. Similarly, *Norton 7.0*'s Disk Doctor recovers and repairs compressed data without requiring that you first reconvert the data to standard DOS format. The program now works with larger hard drives—up to 2 gigabytes uncompressed, 1 gigabyte compressed, according to Symantec officials.



NORTON 7.0 PROVIDES DETAILED INFORMATION about your computer.

Hardware Diagnostics

Another innovative feature is *Norton Utilities'* new hardware diagnostics, which pinpoint faulty system hardware components

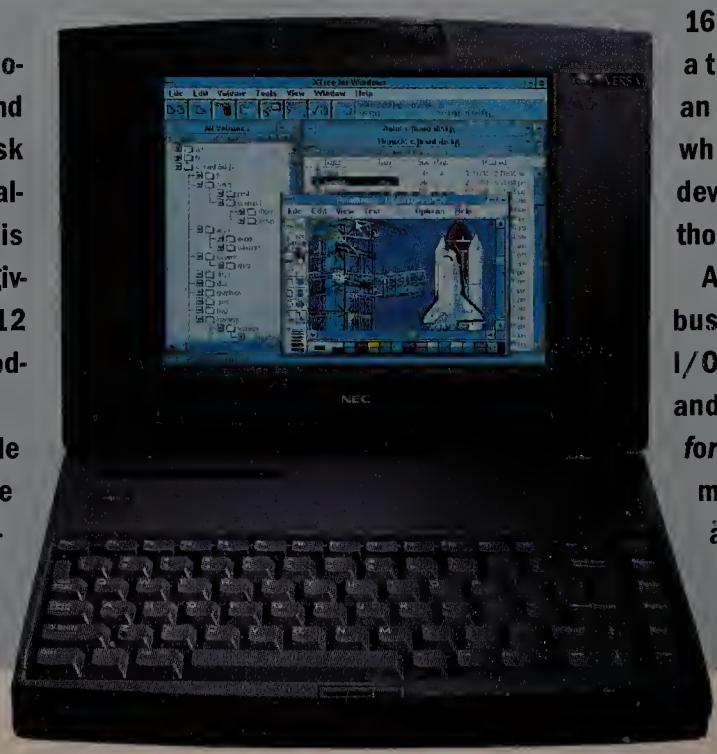
NEC's Versatile Notebooks:

NEC's UltraLite Versa notebooks give new meaning to the term *user configurable*. These Intel 486SL-based systems let you change displays, drives, and battery configurations to meet a particular need, all without tools or hassle. They're available in pen and nonpen versions and weigh 6 to 7 pounds, depending on configuration.

Color active-matrix screens and monochome displays are interchangeable, and you can remove the 1.44MB floppy disk and replace it with a second nickel metal-hydride battery. NEC claims that this exchange doubles normal battery life, giving monochrome systems from 8 to 12 hours on a single charge and color models between 5 and 10 hours.

Switching displays is a snap: Just slide the tabs located on each end of the Versa's upper corners, lift out the 9.4-inch sidelit monochrome display, and pop in a 9.45-inch active-matrix screen. It displays 256 colors at a resolution of 640 by 480 pixels. You can even reverse the display so it faces your audience.

To increase storage or memory, just flip open a sideplate and replace the standard 80MB hard drive with a 120MB or 180MB unit, or upgrade the standard 4MB of RAM to 8MB or 12MB (a 16MB option will be available this fall for a total of 20MB). To add a fax-modem or an ethernet adapter, use the PCMCIA slot, which will accept two PCMCIA Type II devices, or one Type III device as soon as those cards become available.



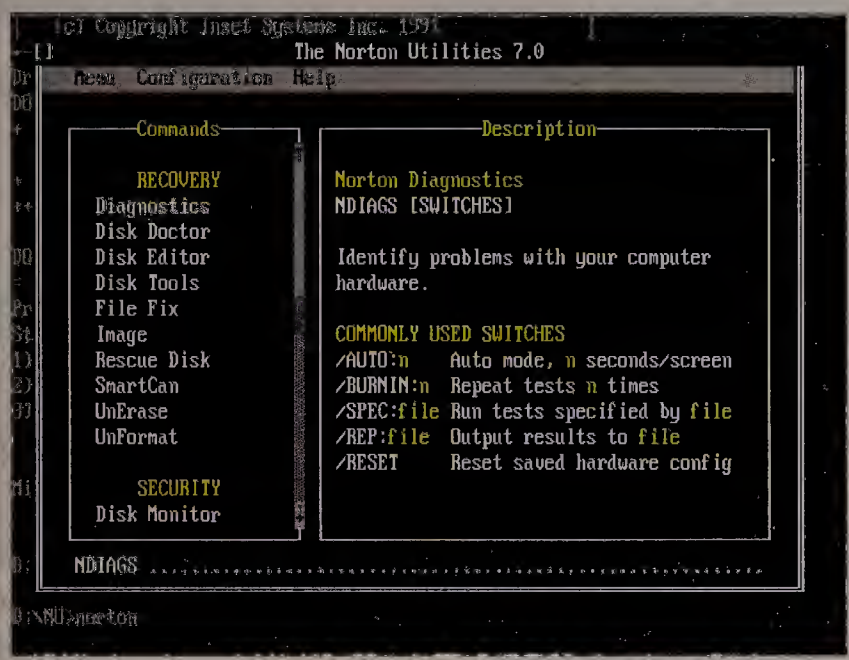
All of the Versa notebooks have local bus video and the standard repertoire of I/O ports. NEC adds a clip-on trackball and preloads both *Windows* (or *Windows for Pen Computing*) and DOS. The nonpen models start at $2659 for monochrome and at $3869 for color. NEC Technologies; 800/388-8888, 508/264-8000.

Reader service no. 739

PHOTO: KIRK AMYX; ILLUSTRATION: JIM LUDKE

before they give up the ghost—particularly useful in preventing sudden data loss caused by defective drives.

The diagnostics program runs a battery of tests on the processor, CMOS, video, memory, hard drives, floppy drives, keyboard, mouse, speaker, and even serial and parallel ports. *Norton*'s straightforward, menu-driven DOS interface includes a pop-up dialog box that explains the purpose of each test before it starts, a feature neophytes will find particularly useful. You can skip any test you find unnecessary and run only the tests you need. For instance, if you want to make sure all the function keys on your keyboard are working properly, you need run only the keyboard test.



NEW HARDWARE DIAGNOSTICS test a system for faulty components.

Faster Disk Duplicator

A new *Norton Utilities* feature known as DupDisk makes it a lot easier for you to copy floppy disks. In version 6.01 you had to swap source and target disks repeatedly just to make one copy, a tedious chore. In version 7.0, however, you simply insert the source disk, and *Norton* uses extended and expanded memory (and the hard drive if the disk's contents are too big for RAM) to hold the disk's entire contents temporarily. You then make as many copies as you need by inserting target floppies and hitting a key. If you're sending out promotional materials on disk, for example, DupDisk will save you from repeated disk swapping. Another plus: If you forget to format a target disk, DupDisk will format it on the fly before writing to it.

Other *Norton Utilities* enhancements include the Advanced Recovery Mode. This feature enables you to recover data from physically damaged disks. The package also provides network support for repairing and recovering data from network drives.

Choose Your Utilities

Like many programs that gobble up megabytes of disk storage, *Norton Utilities* lets you perform a custom installation. You can load only those utilities you'll need—useful if you can't spare the full 5MB of disk space that a complete installation of version 7.0 requires. The install program displays a running total of available hard drive space, which changes as you select and deselect additional utilities.

As you would expect, the program contains mouse-ready menus, and you'll find context-sensitive help throughout.

While *Norton Utilities 7.0* may not represent a radical step up from its worthy predecessor, it builds on Symantec's traditions and packs in more than enough helpful tools to justify its $179 list price.

—Jeff Bertolucci

Norton Utilities 7.0

Hardware diagnostics, improved disk copying, and compatibility with DOS 6.0 mark this version.

Key Features: Repairs and optimizes DOS 6.0, Stacker, and SuperStor compressed drives • Hardware diagnostics • Easier floppy disk copying

Pricing: $179, upgrades $49

Availability: Immediate

Symantec Corp.; 800/441-7234, 408/252-3570, 800/800-1438 (fax)

Reader service no. 740

News Monitor

(continued from page 53)

IBM'S DOS 6.0: IBM's version of DOS 6.0 will be faster than Microsoft's and will have more features, claims Wally Casey, director of marketing for IBM's Personal Software Products division.

Casey says IBM tweaked Microsoft's DOS 6.0 code to make it 20 percent faster than the original. In addition, IBM claims its product will offer better utilities than Microsoft's does. Casey states that IBM is considering including the products bundled with its DOS 5.0, and he says IBM's disk compression product, like Microsoft's, will be tightly integrated with the DOS code.

For its DOS 6.0, IBM also licensed technology from Phoenix Technologies that lets you install and remove PCMCIA devices without rebooting the system as well as boot from a PCMCIA device, says George Adams, Phoenix Technologies' vice president of business development.

NOTEBOOK À LA POWERBOOK: Micro Electronics has jumped into the direct market with a product poised to score: the $1699 WinBook SLC/E, a 5.4-pound notebook powered by a Cyrix 486SLC processor. The WinBook offers 4MB RAM, a 120MB hard drive (a 250MB drive is optional), and six I/O slots, including a PCMCIA 2.0 slot. Measuring 11 by 8¾ by 1¾ inches, the notebook incorporates a built-in trackball below the keyboard, much like Apple's PowerBook.

—Jeff Bertolucci, Russell Glitman, Laurianne McLaughlin, Dan Miller, Randy Ross

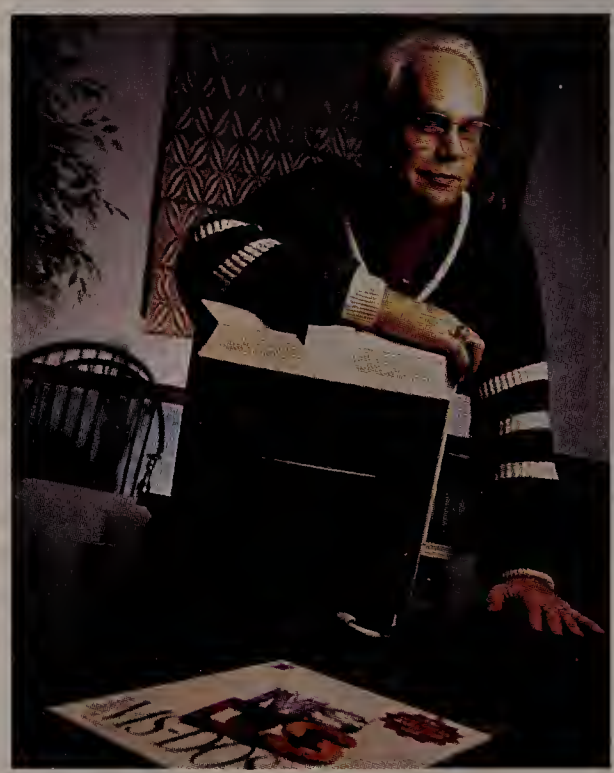
Beta Testers Give DOS 6 an A–

The verdict is in on Microsoft's DOS 6.0: According to beta testers, the compression, antivirus, and memory management utilities are all valuable, but the backup program misses one important feature—tape backup.

The generally favorable consensus came from interviews with seven beta testers, ranging from marketing consultants to MIS managers. Their conclusion: DOS 6.0's utilities do the job—inexpensively (for more complete information, see "DOS 6: Do You Need It?").

While it is expected that DOS 6.0 will sell on the street for less than $50, third-party vendors charge from $70 to $150 *each* for these types of utilities. In fact, DOS 6.0 is the only way some companies can provide utilities to all their PC users, reports Al Meadows, MIS manager at the Oklahoma City law firm Andrews, Davis. "Things like DoubleSpace [the DOS 6.0 disk compression product] and the disk defragger are really valuable, and most of the time we can't buy them. We couldn't afford [Stac Electronics'] *Stacker* for everyone," he says. His company, which is on a tight budget, recently bought 40 new PCs, most with 120MB hard drives. Disk compression will let Meadows' users increase storage inexpensively.

Saving money is one thing, but the real question is: How do the utilities measure up against third-party competitors? Pretty well, say the beta testers. "I find DoubleSpace is not quite as good as *Stacker*," notes Bill Bunch, a systems administrator for 200 PC users at Stanley Fastening Systems, a Rhode Island office products company. "What was at 1.8 compression is now [less compressed] at 1.65. But speedwise it's faster, and it's a godsend that it's bundled with the operating system."



TONY RAIRDEN: Thumbs up on the new DOS.

Similarly, Robert McEwin, a product manager at Scientific Atlanta, a Georgia cable television and satellite communications company, says that even if *Stacker* and AddStor's *SuperStor Pro* products compress a little more efficiently, he'll keep DoubleSpace. "*Stacker* users here tell me DOS 6.0 is more transparent," he says, "and it's adequate for my needs. Another few percent [of compression] won't help me that much."

Beta testers also say the disk defragmenter and MemMaker memory manager will satisfy all but the most demanding users. Steve Evanina, a technical writer at Scientific Atlanta, says a memory manager like Quarterdeck's *QEMM386* will now be a hard sell: "If I get more space and all my stuff runs, what incentive do I have to go out and spend another $100?"

Beta users also like DOS 6.0's scaled-down version of Central Point's *AntiVirus*. "There would have to be a scare that really got my attention [for me] to go out and buy something else," comments McEwin, who has yet to experience a virus attack. Microsoft plans to provide two antivirus updates, free except for shipping and handling costs, from licensor Central Point, which in turn will supply additional updates for a fee.

The one area where DOS 6.0 falls short, according to beta users, is its backup utility, a scaled-down version of Symantec's *Norton Backup*. The main complaint: It doesn't support tape drives. "I'm using tape, and nearly all my clients use tape," says Tony Rairden, a marketing consultant in Nashville. "Once you get above a 40MB hard drive, playing floppy Frisbee is no fun." Rairden is otherwise enthusiastic about the new version.

DOS 6.0 utilities won't please everyone—some power users will always want more, says Will Fastie, an independent PC industry analyst in Baltimore. Users will be able to judge DOS 6.0 for themselves starting on March 30.

—Laurianne McLaughlin

Computer Scam Leaders Convicted

Two men allegedly involved in a PC mail-order fraud ring (see "Consumer Watch Special Report: Scam!" May 1992) have been convicted of trying to sell stolen property.

Robert Michael Hoover and Tony Ortiz Arce (a.k.a. Anthony Palomino) pled guilty to possession of stolen property and conspiracy to distribute stolen property. Hoover also pled guilty to possession of a concealed weapon and possession of a loaded weapon in a public place.

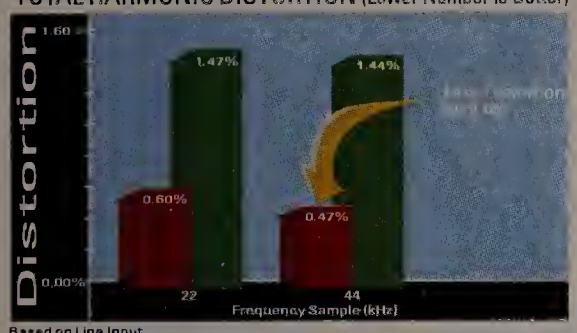
At press time, a preliminary hearing had not been held for the third suspect in the incident, Martin Martinez.

Hoover and Mark Mulvihill, whose company Computer Spectrum was allegedly involved in last year's mail-order scam, have filed business statements for seven new companies in Southern California. Hoover filed papers for L.A. Laptop, Multimedia 2000, United Flex (no relation to USA Flex), Technology Warehouse, and Telecom Systems. Mulvihill filed for Star Com Electronics and PC Depot. There is no indication the men are currently doing business under these names.

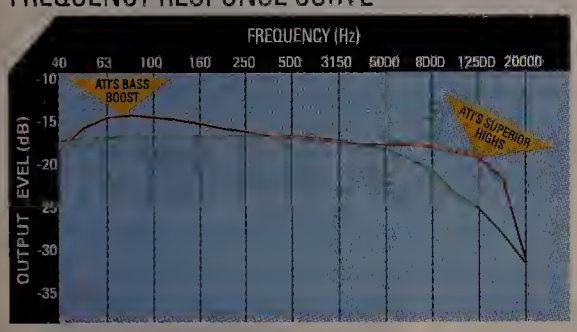
A SOUND THRASHING!

In the Main Event, the Challenge of All Challenges, the Sound vs. Sound Battle, 9 out of 10* people preferred ATI STEREO F/X·CD over SoundBlaster Pro! And here's why:

TOTAL HARMONIC DISTORTION (Lower Number is Better)



FREQUENCY RESPONSE CURVE



Feature	ATI	SB PRO
Price	$199.00	$229.00
486 Joystick Port	Yes	No
100% Stereo	Yes	No
FM Simulated Stereo	Yes	No
Switchless Installation	Yes	No

Clobbering the Competition with Quality Sound
Performance tests prove STEREO F/X·CD has low distortion and wide frequency response. Features a powerful amplifier with added Bass Boost.

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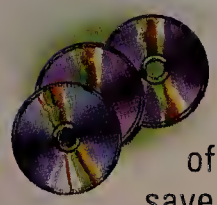
With a price of $199.00[1] including high ranked features and bundled software drivers, STEREO F/X·CD is the true heavyweight champion at lightweight prices.

Industry Standards with Extended Reach
Fully compatible with industry standards to ensure your game and business applications don't take a beating with obsolescence.

AdLib

MPC Sound BLASTER



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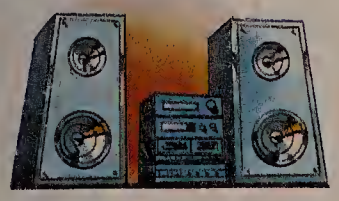
Giving you the advantage of built-in CD·ROM interface saves expansion slots and Quiet CD™ technology to filter out the unwanted noise, for crisp, clear audio.



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All audio ports and sound formats in true stereo including the microphone, CD and Digital audio, PC speaker, line in and 20 voice FM synthesizer. ATI goes the extra round to provide stereo effect to older mono FM applications.

Lightning Speed Joystick Port
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Circle 5 on reader service card

High-Res Printer in a 486 Note

CANON'S NOTEJET 486 includes a printer.

TEST DRIVE

An inch here, a pound there—at first glance, the NoteJet 486's 12.2-by-10-inch waistline would appear to disqualify it from any claim to notebook convenience. But looks are deceiving. Close inspection reveals a unique advance in mobile computing—this notebook contains a built-in 360-dpi ink jet printer.

To duplicate this combination of on-the-road functionality and convenience, you'd have to solder a standard notebook to a portable printer. Even then, you couldn't match the NoteJet 486's 7.7-pound weight, small footprint, and battery-powered operation or the speed and quality of its output—to say nothing of its price: The base model lists for $2499.

The NoteJet makes it practical for the first time for insurance adjusters, traveling salespeople, and desktop presenters to generate laser-quality letters, invoices, reports, spreadsheets, and graphics in an airplane, an airport, or an automobile.

Everything about the NoteJet is compact. The Bubble Jet print system is 75 percent smaller than the one on Canon's BJ-10ex portable ink jet. Canon has excised dead space and cut power demands by putting the controller mechanisms on the motherboard and employing a new printhead with a smaller, replaceable ink reservoir.

A similarly miniaturized paper-feed mechanism pulls letter-size paper or transparencies along a flat paper path from a ten-sheet feeder located under the computer's removable keyboard. It also takes legal or 7.1-inch-square notepaper one sheet at a time, in addition to envelopes.

The NoteJet prints 360-dpi text at a brisk 116 cps—about 2 pages per minute. Graphics print speed depends on the complexity of the image. But overall, the NoteJet 486 is about 30 percent faster than the BJ-10ex—and with better resolution, thanks to the close integration of printer and computer. The speed comes from a Canon-designed ASIC that moves print data in a steady stream along the AT bus, about ten times faster than a regular CPU can shove data packets out a parallel port.

The space-saving design also saves on consumables. No longer do you have to replace a printhead/ink tank combination every time the ink runs dry—the NoteJet's printhead is a separate $43 replaceable device that should last you through 50 ink tanks (each about $8 and good for around 60 8½-by-11-inch sheets). You can expect printing costs to hover near 14 cents a page, says Canon, more than twice the overhead of a portable Bubble Jet but an awesome improvement over the typical hotel fax charges of $2 to $5 a page.

Computer Power

On the CPU side, the NoteJet 486 is controlled by Texas Instruments' newcomer 25-MHz 486SLC with 1K of on-board cache and TI's unique power-management system. You get 4MB of RAM, expandable to 12MB via the 4MB snap-in SIMMs. You also get an on-board 1.44MB floppy and can choose an 85MB, 135MB, or 180MB hard drive. The 9.5-inch diagonal VGA backlit monochrome LCD produces 16 grays at 640 by 480.

DOS and *Windows 3.1* are both preinstalled, and a Canon-designed pointing device cradles in your palm, with an easily maneuverable trackball under your thumb.

The standard complement of serial, parallel, external VGA, and PS/2 mouse ports are augmented by two PCMCIA Type II slots—stacked so that they accept not only standard, thin peripherals but also double-thick miniature hard drives.

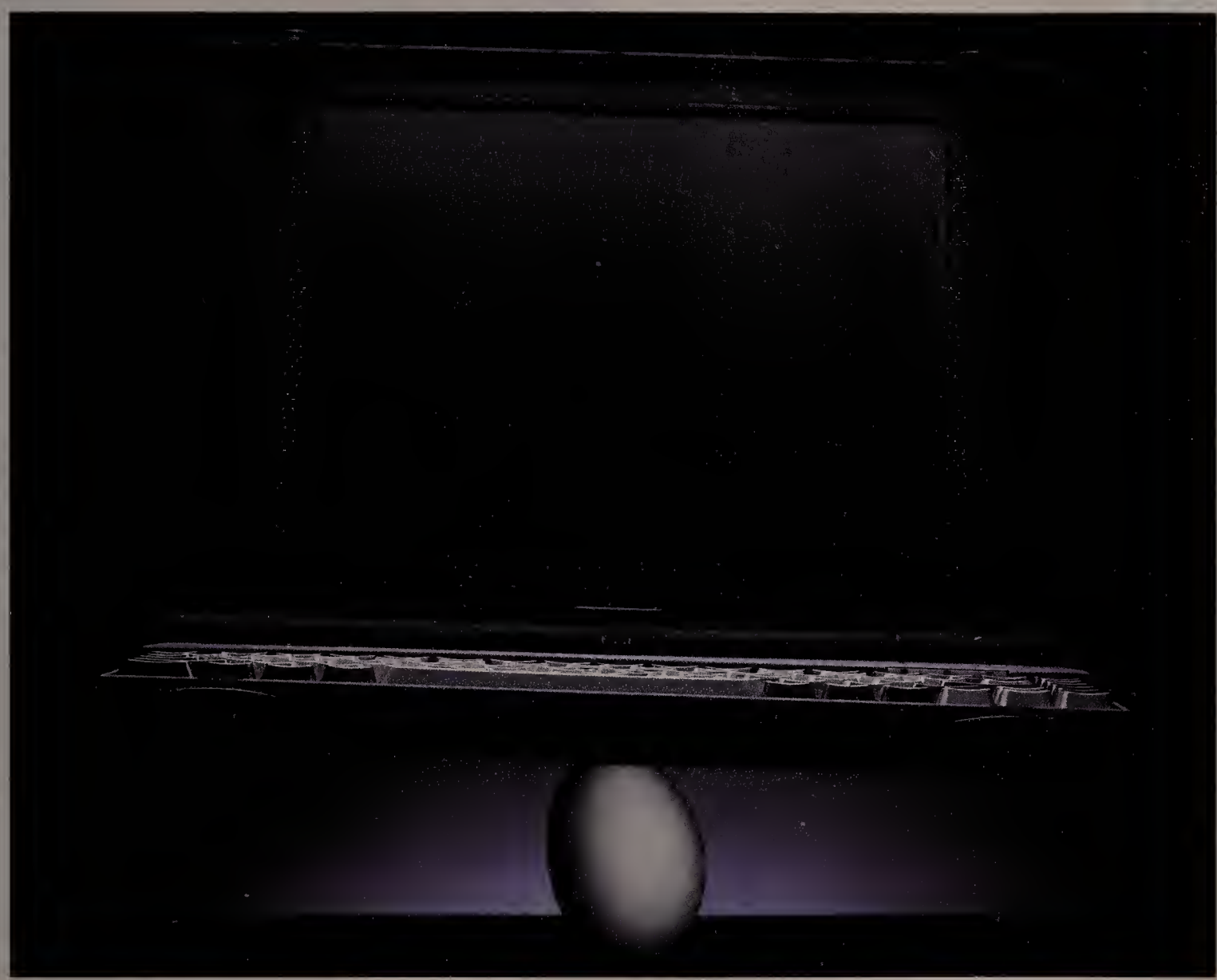
With its traveling weight of less than 9 pounds, the NoteJet 486 fits comfortably on your knees or in your briefcase, and a single charge of its nickel-cadmium battery provides you with 2 to 3 hours of power-managed computing plus eight pages of printing. For producing your proposal-quality letters and reports or spreadsheets and graphics on the road, there isn't any better way to go.

—Mike Hogan

Canon NoteJet 486

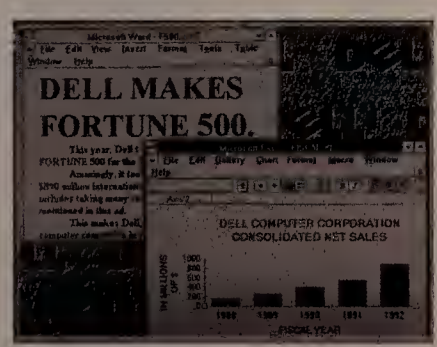
The first notebook with a built-in ink jet printer.
Key Features: 25-MHz 486SLC CPU power • Under-9-pound traveling weight • 2-ppm printing
Pricing: 4MB RAM and 85MB drive $2499, 135MB $2799, 180MB $2999
Availability: Immediate
Canon Computer Systems, Inc., 800/848-4123, 714/438-3000
Reader service no. 728

THERE'S NOTHING LIGHTWEIGHT ABOUT THIS 3½ POUND NOTEBOOK.



At just over 3.5 lbs, the Dell® 320SLi offers features and functions usually reserved for systems twice its weight. So call and order one today. At this price, it shouldn't be a heavy decision.

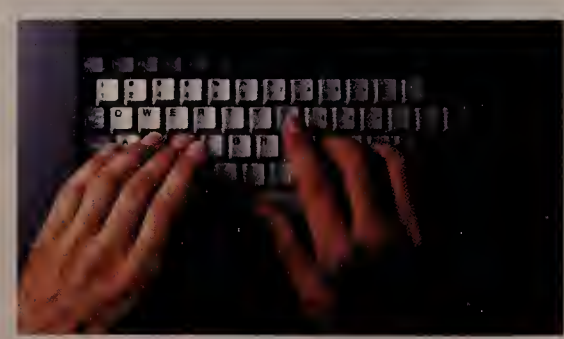
You're not the only one working late. Dell's toll-free support lines are now open 24 hours a day, 7 days a week. There's also nationwide on-site service and a 24-hour TechFax℠ line.△



Comes with all you need to run the most hardcore software, including MS-DOS® 5.0 and Microsoft® Windows™ 3.1.

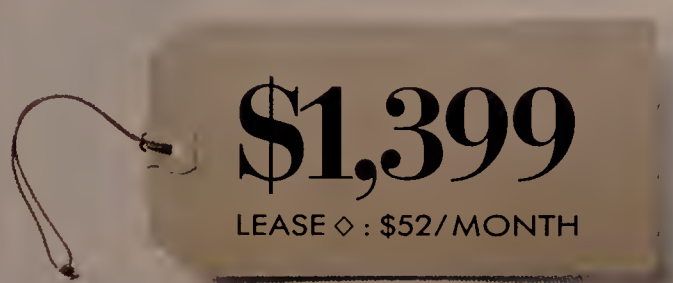
intel inside®

That's not all you'll find in here. There's room for a modem, coprocessor, 120 MB hard drive and up to 10 MB of RAM.



Your hands don't get smaller just because your computer does. So Dell gave the 320SLi a full 85-key keyboard with special screen navigation keys, and a built-in keyboard mouse.

We call it a notebook, but it's actually smaller. Just 7¾" x 11" and only 1¼" thick. So you might actually be able to fit some briefs in your briefcase. Maybe even a sandwich or two.



This small number gets you all these big numbers: 20 MHz i386™SL processor, 2 MB of RAM, 60 MB hard drive, VGA Reflective (9.5", 640 x 480) LCD, external 3.5" floppy drive and up to 4 hours of work from the NiMH battery.

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DOS Word 6.0 Does Drag-and-Drop

TEST DRIVE ▶ Be careful—reading what follows may make you feel old: *Microsoft Word* is celebrating its tenth anniversary and is now on its sixth revision.

New features bring *Word* tantalizingly close to, you guessed it, *Word for Windows*, including an easy-to-use table editor, drag-and-drop text editing, a ribbon with new formatting functions, and a built-in grammar checker.

Microsoft Word 6.0

A major upgrade to this granddaddy of DOS word processors brings it closer than ever to Windows.
Key Features: Built-in tables • Drag-and-drop text editing • Print-merge guide • Lines, borders and special symbols • TrueType fonts • Print preview with zoom
Pricing: $450, upgrade $99 until September 30, free upgrade to 1.0 users
Availability: May
Microsoft Corp., 800/426-9400
Reader service no. 729

Fire up *Word 6.0*, and you'll find a screen that looks like the one in *5.5*, but with a new tool bar. The familiar *5.5* symbols for boldface, italic, and underline are shortened to their first letter, making space for new indent and outdent symbols that let you move a paragraph in or out one tab stop. Look closely, and you'll see a grill in the midst; clicking on the pound sign (#) inserts a table into your document. Click and drag on the table to expand it; as you add information to a cell, it grows automatically.

To move a sentence or a paragraph, just select it, put the mouse pointer in the highlight, hold down the mouse button, and drag the text into place. No more cutting and pasting.

In the old days putting, say, a square bullet in your document meant thumbing through the manual for code numbers, then pressing <Numlock><Alt>-223. *Word 6.0* automates this task for you. To add bullets to a list, select *Tools•Bullets* and choose the one you want from a list. (One caveat: To keep moving fast, *Word* puts a placeholder on your screen instead of the bullet; press *File•Print Preview* to see what your bullets look like.)

SEE YOUR DOCUMENT UP CLOSE in Word 6.0 by clicking on a plus or minus sign. You can view text in magnifications of 50 to 200 percent.

The clumsy Line Draw function has been replaced with functions that let you put borders, colors, and shading around text. Just select the paragraph, choose *Format•Border*, and select the attributes you want; the border automatically fits the text. *Word 6.0* also comes with built-in TrueType fonts.

One of the most daunting tasks is print merge. With version 6.0, this job is easier; you're prompted at every step and see a graphical representation of the process. *Word 6.0* also has a built-in collapsible outliner that easily turns your document into an outline and back again.

One of *Word 6.0*'s best points may be its frugality; you get lots of function for about half the number of megabytes a graphical word processor needs. The program eats 5.5MB or less and can run on a 286 under DOS 3.0. For the $99 introductory upgrade price, DOS users may just want to have this dance.

—Bronwyn Fryer

A General Magic Hand-Held:

General Magic, an Apple Computer spin-off devoted to the advancement of "personal intelligent communicators" (tiny hand-held PCs with pen interfaces and wireless links), is developing software to link the gadgets with communications and computer nets, E-mail systems, and on-line services. While General Magic does not plan to build or sell its own hand-helds, it is licensing its Telescript programming language and Magic Cap user interface to companies that do plan to. Users of Telescript-based systems will be able to route messages through local and wide area nets and wired and wireless communication services, says General Magic cofounder, president, and CEO Marc Porat. Telescript will run on all major computing platforms, including DOS, *Windows*, Windows NT, OS/2, Macintosh, and UNIX. Magic Cap is intended for hand-helds like Apple's yet-to-ship Newton.

If General Magic's goals appear to be overly ambitious, take another look. The company's list of partners reads like a *Who's Who* of computing and consumer electronics: Apple, AT&T, Matsushita, Motorola, Philips, and Sony. Mead, News Corporation, and Intuit have also announced plans to use Telescript and Magic Cap to create information services for the new breed of hand-helds. Stay tuned: General Magic has plans to release additional product information this summer.

Flowcharting

Easier and Faster than *ever* before!

HavenTree has cranked up the power on **EasyFlow** with a release that lets you **create your own shapes**, offers a host of **new text handling features**, exports charts in a wider variety of graphics formats **than any other flowcharting program** and **supports more printers and plotters** than any other DOS-based competitor. We've even given our already highly **intelligent line router** an IQ boost. These **new and improved** features, combined with those listed below, make EasyFlow the **World's #1 flowcharter.**

- *Create new shapes or modify existing ones.*
- *Automatic off-page connectors and adjacent-page mapping help make complex charts easier to read.*
- *Automatic page borders and numbering.*
- *Automatic text formatting.*
- *Context-sensitive help.*
- *Support for LIM expanded memory.*
- *Runs on your network.*
- *Exports charts to ASCII, CGM, DXF, EPS, GEM, PCX, HPGL, SYM, TIFF and WPG file formats.*
- *Charts compatible with EasyFlow Mac version.*
- *Improved color output - HP DeskJet 500C, HP PaintJet, Epson LQ2550.*
- *Tutorial included.*

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NETWORKING FOR THOSE TRYING TO RUN A BUSINESS. NOT A COMPUTER.

If you're a Windows user, Windows for Workgroups is the easiest way to network. If you're not using Windows, it's one of the best reasons to start.

No matter what business you're in, you stand to do a lot more of it when all your PCs are working together. And Microsoft® Windows™ for Workgroups is the easiest way to connect them.

Everyone benefits from a network. You can share letters and memos. And you can share one printer instead of buying several. Groups can develop reports together. Departments can work on common files. And everybody can have access to the latest (up-to-the-nanosecond) customer database or even an accounting system. Of course, Windows for Workgroups has security features in case you don't want everybody up on all the latest.

We could tell you how well Windows for Workgroups works. But it might be more convincing if you heard it from someone like you, who doesn't have a lot of time to spend running computers.

Crest Oelke at Dairy Queen of Greater St. Louis decided on Windows for Workgroups after watching 4 of his employees try to manage the accounting for 3 operations. Now they don't have to enter the same inventory, payable and receivable data into several PCs. Instead, they enter it once into their accounting package and it's a done deal, making everyone's life a lot easier.

Over the next year, Crest figures he'll save around $30K. Money that might be spent on more important things. Like ice cream.

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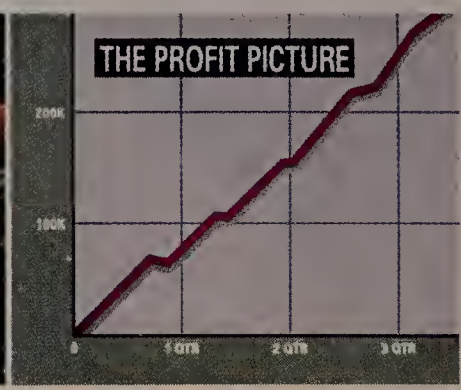
Call us at (800) 426-9400, Department JM7.

And start networking with Microsoft Windows for Workgroups. You'll be amazed how little time you spend on your PC.

And how much more time you can spend on your business.



Left: Windows for Workgroups makes it easy for groups to share files and information. Right: Which makes it much easier for you to show a profit.

Microsoft
Making it easier

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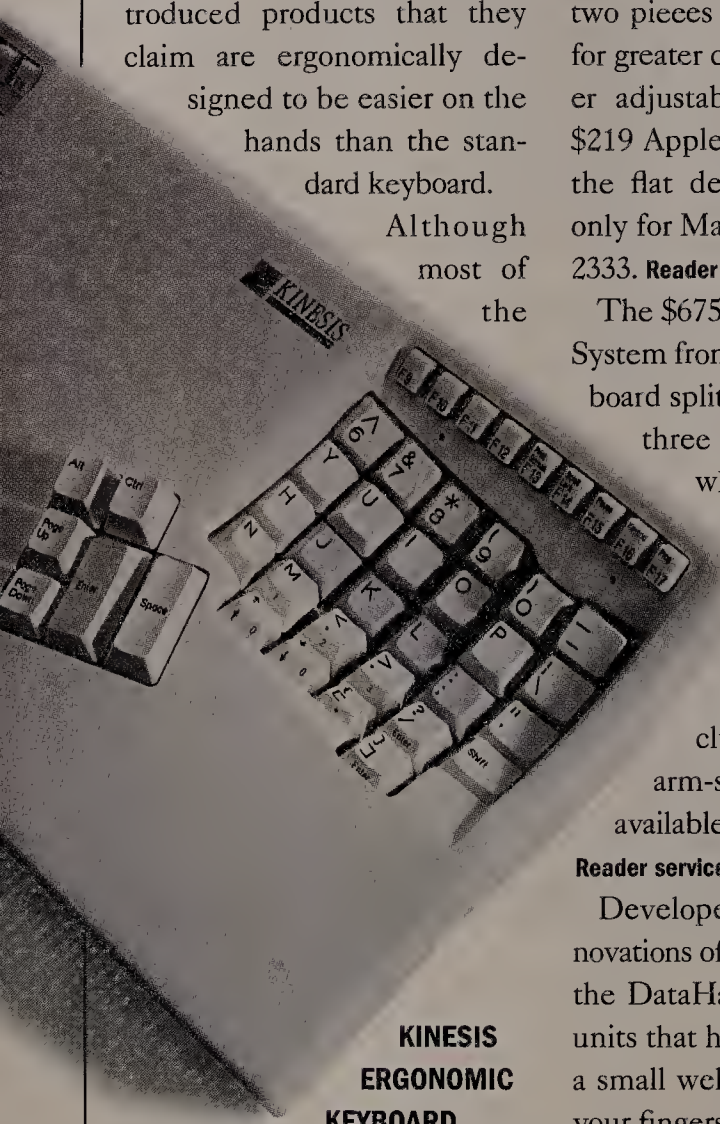
Weird Keyboards: Rx for Hands?

PC users looking for an alternative to the standard QWERTY keyboard don't have long to wait. A number of companies have announced or introduced products that they claim are ergonomically designed to be easier on the hands than the standard keyboard. Although most of the early entrants are new firms hoping to help prevent repetitive strain injuries (see "Danger at Your Fingertips" in this issue), at least two major players—Key Tronic and Apple Computer—have joined them.



KINESIS ERGONOMIC KEYBOARD

Keyboard design changes run the gamut from a more conveniently located <Backspace> key to a completely reworked approach to data entry.

The developers of these keyboards want to make the keys more accessible, reducing typing effort and lessening the risk of repetitive stress injuries. The ways that they go about achieving that end vary considerably. Newly announced units are described below.

Apple's Adjustable Keyboard, introduced in January, splits into two pieces that can be angled for greater comfort. Unlike other adjustable keyboards, the $219 Apple product maintains the flat design. It's available only for Macintoshes. 800/776-2333. **Reader service no. 730**

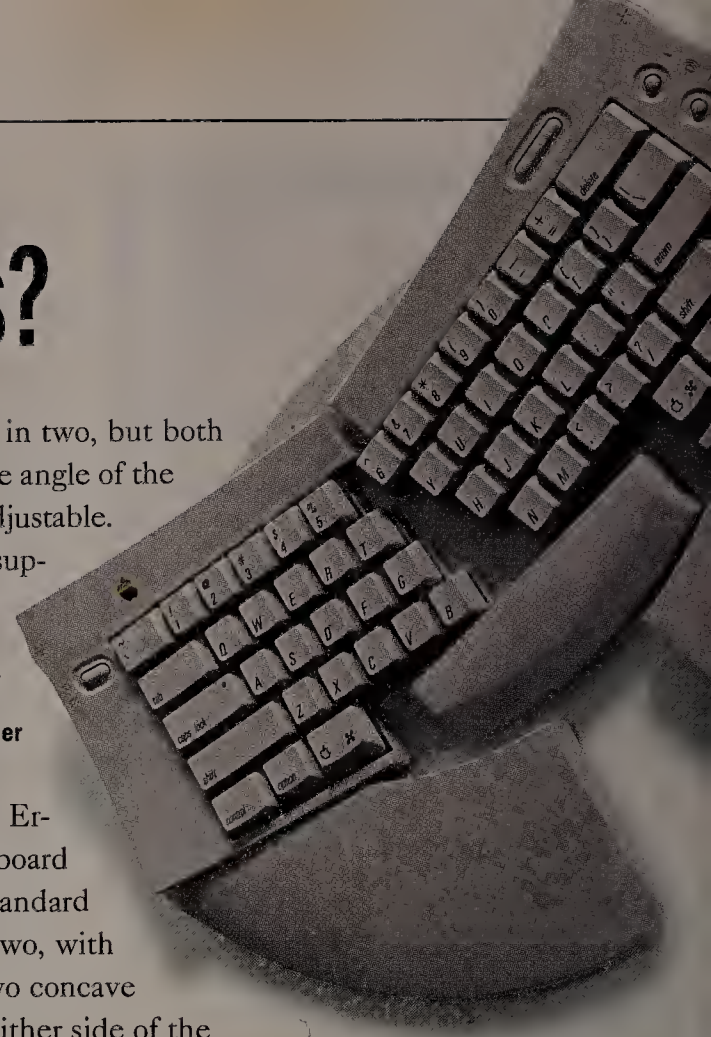
The $675 Comfort Keyboard System from Health Care Keyboard splits the keyboard into three sections, each of which rotates and tilts to any position. Distance between the sections is adjustable. The unit includes a two-section arm-support system. It's available now. 414/253-4131. **Reader service no. 731**

Developed by Industrial Innovations of Scottsdale, Arizona, the DataHand consists of two units that house 5 keys each in a small well in which you rest your fingers. By using a combination of the 10 keys, you can emulate all 101 keys that are found on typical keyboards, as well as mouse functions. The company hopes to begin shipping by the second or third quarter of this year. 602/860-8584. **Reader service no. 732**

The $489 FlexPro from Key Tronic also splits the keyboard in two, but both the tilt and the angle of the sections are adjustable. Built-in wrist supports travel along a track in front. 800/262-6006. **Reader service no. 733**

The Kinesis Ergonomic Keyboard divides the standard keyboard in two, with keys set in two concave "dishes" on either side of the keyboard. Some keys, such as <Delete>, <Backspace>, and <Enter>, have been moved to redistribute the work load from the little finger to the thumbs. The Kinesis is available now for $690. 206/455-9220. **Reader service no. 734**

The MiniErgo keyboard from Marquardt Switches looks like a standard keyboard, with a few significant modifications. The keys have been divided into two sections at either end of the keyboard. Between the two sets of keys are the <Delete> and <Insert> keys and the cursor keys. The keyboard is angled slightly (the degree of angle is not adjustable) and has built-in wrist support. The MiniErgo should be available by late May for $179. 315/655-8050. **Reader service no. 735**



APPLE'S ADJUSTABLE KEYBOARD can be split into two pieces.

The Tony Ergonomic KeySystem is a fully adjustable unit that can be angled and tilted for comfort. Its inventor, Anthony Hodges, was at work on adjustable keyboards in 1981, long before PC users even considered the need for a more ergonomic design. Even the keys themselves can be moved for the most comfortable spacing. Hodges is currently negotiating with companies interested in manufacturing the keyboard and hopes to have units available by summer. 415/969-8669. **Reader service no. 736**

—Roberta Furger

COMFORT KEYBOARD SYSTEM sections can be infinitely repositioned.

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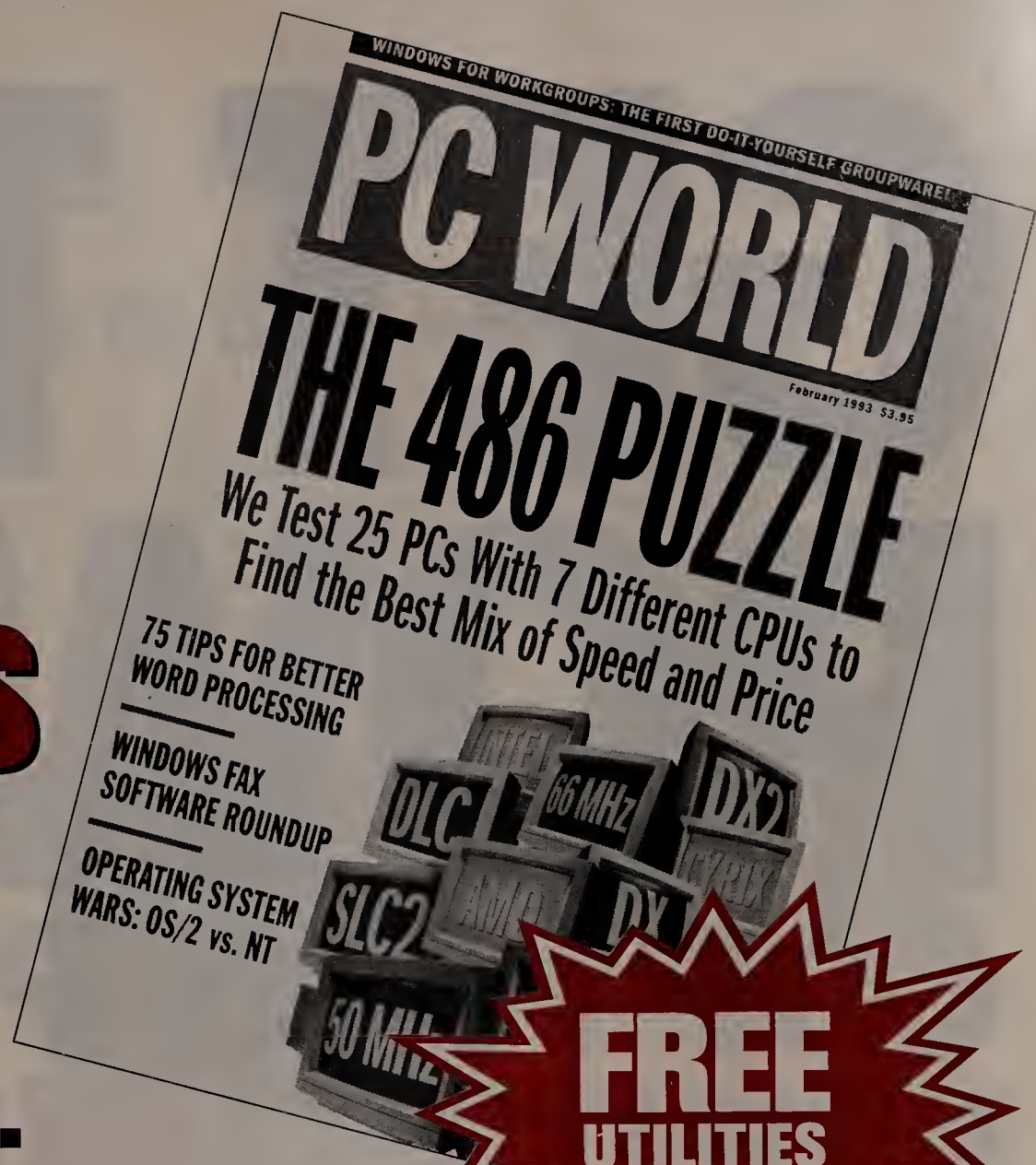

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3ABC7

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Canon

Circle 64 on reader service card

Three Major Vendors Get Serious With CD- and Audio-Ready PCs

No pain, no gain: no more. Anyone who has installed components such as CD ROM drives knows the hassle of ramping up to professional-quality sound, full-motion video, and interactive reference software. Now system makers AST Research, Dell Computer, and Insight Computers have taken the pain out of upgrading, with ready-to-work PCs featuring preinstalled internal CD ROM drives, sound cards, and plenty of popular software.

Insight's 486/DX2-66MHz VESA VL Bus Multimedia system is the most powerful—and, at $3999, the most expensive—machine of the three. It packs a 245MB IDE hard drive, a 256K secondary memory cache, and 8MB of RAM expandable to 32MB. It also delivers fast local bus video performance with a VESA local bus (VL bus) graphics accelerator and a solid 15-inch NEC MultiSync 4FG monitor. As for expansion, the computer's roomy tower configuration includes seven drive bays, five ISA slots, and a 300-watt power supply.

Insight's Talon TA-200 drive is one of the fastest units available, boasting a 256ms average seek time and 300K/sec throughput that can handle the most demanding applications. The Pro Audio Spectrum 16 sound board and Labtec speakers offer high-quality 16-bit sound suitable for presentations.

486/DX2-66MHz VESA VL Bus Multimedia, OfficeStation 433s/L, Advantage Pro 486SX/33 Multimedia

Three multimedia-ready PCs with preinstalled components that eliminate the hassle of installing multimedia hardware yourself.

Insight Computers
800/927-7848,
602/350-1148 (fax)
List price: $3999
Reader service no. 681

Dell Computer
800/289-3355,
512/343-3653 (fax)
List price: $2349
Reader service no. 682

AST Research Inc.
800/876-4278,
714/727-9355 (fax)
Street price: under $2000
Reader service no. 683

DELL'S $2349 OFFICESTATION 433s/L features a Panasonic CD ROM drive, a Sound Blaster16 card, a 33-MHz 486SX processor, and a super-VGA monitor.

Dell's Balance

Dell seeks to balance price and performance with three multimedia PCs based on the 333s/L and the modular 486L family. The $2349 OfficeStation 433s/L is the most powerful version, with a 33-MHz 486SX processor, 4MB of RAM expandable to 64MB, and a 14-inch super-VGA monitor. An integrated local bus video accelerator promises to boost performance, but the base model has a relatively small 170MB hard disk and lacks a secondary RAM cache. The OfficeStation features two free ISA slots and a 150-watt power supply for moderate expansion. Power-hungry users can get a roomier 230MB hard drive and a 128K secondary cache for $100 apiece over the base price. A 33-MHz 486DX processor is available for an extra $200.

The OfficeStation 433s/L system includes a Panasonic CD ROM drive that has a 390ms average seek time and 150K/sec throughput. The Sound Blaster16 card and Labtec CS-550 speakers produce high-quality 16-bit sound that's more than adequate for file annotation and most presentations.

AST's Advantage

The most affordable multimedia system of the three is AST's Advantage Pro 486SX/33 Multimedia, with a street price of under $2000. Like the Dell, the Advantage Pro's 170MB hard disk and lack of a secondary RAM cache might prove insufficient for data-hungry applications, but upgrades such as Intel's OverDrive processor and an external cache can boost performance. The Advantage Pro ships with 4MB of RAM expandable to 64MB, a 14-inch super-VGA monitor, and integrated video to maximize expansion space. Three free ISA slots, two free drive bays, and a 145-watt power supply ensure expandability.

The preinstalled Sony CDU-31A CD ROM drive plays Kodak's multisession Photo CDs and features a 490ms seek time and 150K/sec throughput. On the audio side, the 8-bit Sound Blaster Pro II card falls short of professional-quality sound but suffices for games, voice annotation, and most business applications. Like the Dell and Insight systems, the AST includes a pair of amplified speakers as well as a software bundle featuring business applications and a choice of popular CD ROM titles.

—Mike Desmond

Nikon's Slide Scanner Breakthrough: Desktop Service Bureau

What do you do when you have a stack of 35mm slides and you want to reproduce them in your newsletter, report, catalog, or presentation? Organizations faced with this problem have traditionally sent the slides out to a service bureau for scanning and conversion or else bit the bullet and plunked down as much as $15,000 on a professional slide scanner to finish the job in-house. Nikon has just sugarcoated that bullet with the extraordinarily low-priced LS-10 Coolscan Film Scanner. The LS-10 comes in two flavors: The internal model, which fits in a half-height drive bay, retails for $2195; the external version is $2495. Given the cost of a comparable color scan at a service bureau ($30 or more per slide), the Coolscan will pay for itself after fewer than 100 scans.

The Coolscan accepts color or black-and-white negative strips as well as slide transparencies and scans them in a single pass to produce resolutions up to 2700 dpi. The unit uses LED illumination—red, green, and blue light-emitting diodes—to produce high-quality 24-bit image files. And it's fast, too: "Prescans" take roughly 20 seconds, and Nikon is claiming approximately 100 seconds for a full scan of a 1024-by-1024-pixel image. From there, it's easy to import your images into a desktop published document or image database.

Scheduled to ship in April, the external Coolscan weighs 4.2 pounds and is 5.83 inches wide by 12.61 inches long by 1.85 inches high. Both units hook into a *Windows* or Windows NT PC or a Macintosh via a SCSI interface and come with the necessary cables and, for the PC, an interface card. You set image variables (resolution, width, height, brightness, contrast, and so on) in software that comes bundled with the scanner and click on the appropriate button to preview or begin the scan. You can also run the Coolscan from within any application that supports *Adobe Photoshop* plug-ins.

The LS-10's designers named it Coolscan because of its heat dissipation and low power consumption. If you thought it was simply, well, cool, you probably wouldn't get an argument.

—Steve Fox

Nikon LS-10 Coolscan Film Scanner

High-resolution, compact unit from industry big shot Nikon brings affordable slide scanning to the desktop.

Nikon, Inc.
800/526-4566,
516/547-0305 (fax)
List price: Internal model $2195, external $2495
Reader service no. 685

Texas Instruments' Low-End, Low-Priced Printers

Texas Instruments microWriter Printers

Low-priced personal page printers.

Texas Instruments
800/527-3500
List price: microWriter $729, microWriter PS17 $999, microWriter PS35 $1299
Reader service no. 684

The big word in printers this year is *personal.* Virtually every major vendor has plans to release a low-cost, no-frills page printer with a small-enough footprint and just enough functionality to serve a single user. Among the first entries in this new wave of personal printers are Texas Instruments' new microWriters.

What's so personal about them? Price, for starters. The basic model lists for $729, with street prices in the $650 range. A PostScript version with 17 scalable fonts is $999 list; a 35-font model is $300 more.

All three microWriters use the same 16-MHz Motorola 68000 processor and the same 5-page-per-minute LED print engine, which delivers 300-dot-per-inch resolution and is rated to print 5000 sheets a month.

THE MICROWRITER LED PAGE PRINTER from Texas Instruments is a compact, 5-ppm laser that starts at $729.

All three models use the same small case (the footprint is 13.8 inches by 10.4 inches). Each comes with a 250-page paper tray that handles letter- and legal-size paper, envelopes, labels, and transparencies. You can upgrade them with a second 250-sheet paper tray ($199 list), as well as a special media feeder ($99 list) that automatically feeds envelopes, labels, and transparencies through a straight paper path.

The basic model is PCL 4 compatible and comes with the same 14 bit-mapped fonts used in the Hewlett-Packard IIP. It's outfitted with 512K of memory, which should be enough for most text jobs, but it may have problems handling more data-intensive graphics. You can add up to 4.5MB and new font emulations. The interface is limited to a single parallel port.

If you need scalable fonts, you can move up to one of the two PostScript models. Both come with 2MB of memory upgradable to 4MB and automatically switch between PCL 4 and true Adobe PostScript.

—Dan Miller

SPLIT DECISION

The case for the ultimate in technology: MX15F

- 15-inch Microprocessor-based Color Monitor.
- Flat Square Technology Picture Tube with Invar Shadow Mask.
- 0.28mm Dot Pitch.
- 1280 x 1024 Non-interlaced Resolution.
- Intelligent Mode Switching.
- Digital Controls.
- LED Indicators for Mode and Status Information.
- Vertical Refresh Rate up to 76 Hz at 1024 x 768.

The case for the ultimate in value: LX1564

- 15-inch Flat Square Technology Color Picture Tube with Invar Shadow Mask.
- 1280 x 1024 Resolution.
- Ergonomic Analog Controls.
- Automatic Synchronization and Sizing.
- Vertical Refresh Rate up to 76 Hz at 1024 x 768.

When it comes to advanced technology there's no debate. The MX15F has it all. From its super-sharp image to an on-board processor, ultrahigh resolution, optimal synchronization and sizing, LED status read outs and more...much more.

Ideally suited for high-level engineering, scientific, graphic and business applications, the MX15F is the computer monitor of choice for serious power users.

It's no wonder the MX15F has won so many awards. These include *PC Magazine* Editors' Choice-1993 and *PC World's* Best Buy in both 1991 and 1992.

Clearly, this is the monitor for those who refuse to compromise. It delivers the very highest performance, quality and technology.

PC MAGAZINE EDITORS' CHOICE 1993 — PC WORLD BEST BUY 1991 — PC WORLD BEST BUY 1992

For high performance at an affordable, competitive price, the new LX1564 is the popular choice.

Using the advanced 15-inch flat square picture tube in combination with an economical design, it offers a true melding of high-performance and economy.

And, with features like edge-to-edge overscan and 80 MHz video bandwidth, the LX1564 compares well against competitor's higher priced models.

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Two great monitors. Two sets of features. Designed to fit the way you work. Designed to fit your budget. The choice is yours – Ultimate Technology or Ultimate Value.

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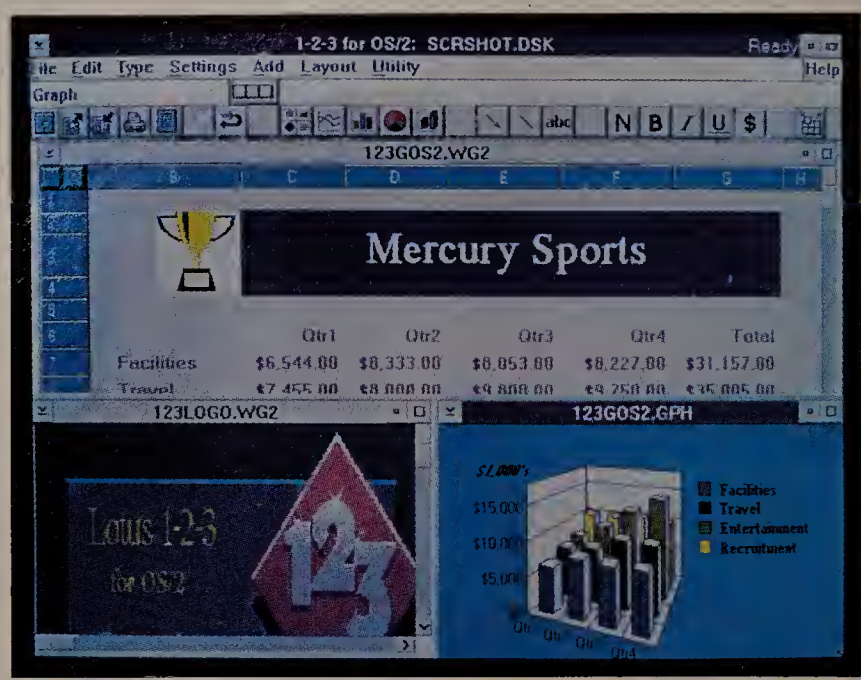
Circle 169 on reader service card

1-2-3 and Freelance Graphics Move Up to OS/2 2.0



1-2-3 FOR OS/2 2.0 is optimized for OS/2's 32-bit graphical environment. Customizable SmartIcons let you easily perform common tasks like printing, graphing, and formatting numbers.

Though Lotus's OS/2 2.0 upgrades for *1-2-3* and *Freelance Graphics* are not the killer apps that will compel users to trade up or over to OS/2, they do provide proof that *Windows* is not the only game in computing. Both applications are optimized for OS/2 2.0's 32-bit graphical environment; hence, they offer enhancements and new features not available in earlier OS/2 versions of *1-2-3* and *Freelance*. The new products, priced at $495 each, cost up to $200 less than their predecessors.

Usability

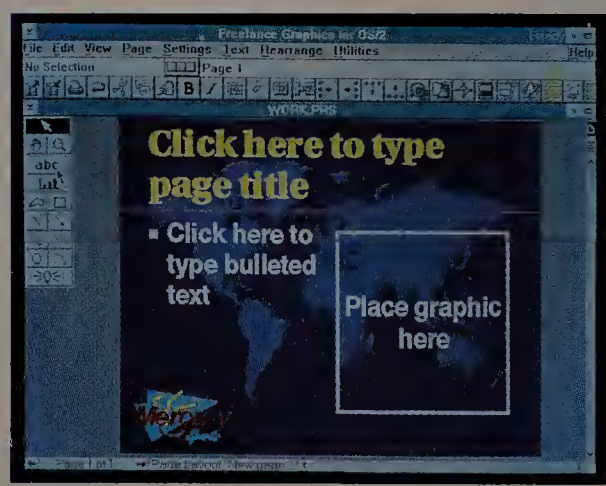
On the ease-of-use front, both products take advantage of OS/2 2.0's features, such as the Workplace Shell, a Mac-like graphical environment. The main benefits here are drag-and-drop capabilities, which save time and mouse work. To open several documents, drag them onto either the *Freelance* or *1-2-3* icon; OS/2 will fire up the program and load the files automatically. To open a single file, double-click on the file's icon, and OS/2 opens the associated application and loads the file. Both products also include SmartIcons, which execute common commands, such as printing, graphing, formatting numbers, and boldfacing or italicizing text, with a mouse click.

One performance enhancement will likely go unnoticed. Lotus claims you'll encounter fewer crashes, particularly when multitasking these two programs with other programs. You will also avoid multithreading crashes, which occur when you force these two applications to perform several simultaneous tasks, such as printing, recalculating, and opening a file.

Increasing the robustness of the products adds to system overhead and means you'll wait up to 50 percent longer for the programs to load than with the 16-bit versions, according to Lotus. But once they're loaded, you should notice that it takes up to 20 percent less time for common activities such as redrawing screens and retrieving files, the company claims. Future versions of OS/2 that promise more 32-bit capabilities, such as OS/2 2.1, which is expected to ship by July, will likely improve the performance of both applications.

Added Windows Features

Finally, Lotus has enhanced the applications themselves. To *Freelance Graphics* Lotus added features from the *Windows* version that make the product easier to use. For instance, the new OS/2 version prompts you through the creation of new presentations. (The last OS/2 version presented you with a page of bulleted instructions.) The new version also prompts you to add text directly to presentations and displays a cursor. Adding text to the previous version required that you use the text tool located in the margin. Buttons on the bottom of the screen now let you add or scroll through pages of a presentation, so you don't have to wade through all the menus.



FREELANCE GRAPHICS FOR OS/2 2.0 prompts you for text input, making it quicker and easier to create presentations than before.

The main addition to *1-2-3* is a print-to-fit feature that compresses a large range to fit onto a page or expands a small range so it fills more of a page.

There are also two new chart types: radar, which resembles a radar screen and lets you depict the deviation of data from an average, and candlestick, which is useful for plotting stock prices.

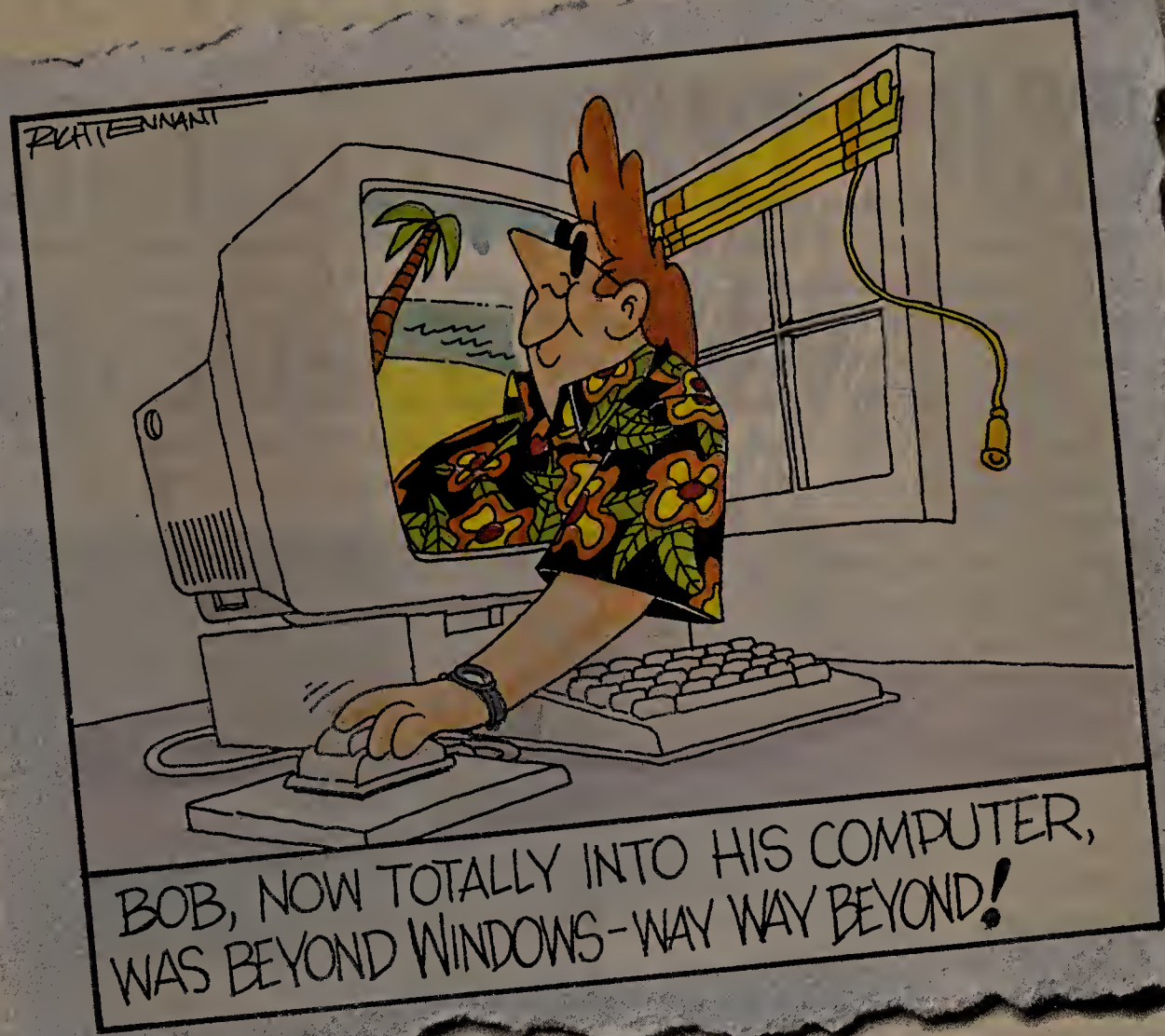
Lotus developed both products simultaneously and they share some program code, creating complementary features that make them easier to learn. For example, both use the same charting engine to create graphs, so you need to learn to use this tool only once. Because you create graphs with the same tool, either program can read and modify files—without any translation. In addition, an automatic linking feature lets changes that are made to a spreadsheet or graph in *1-2-3* automatically show up in a *Freelance* presentation that relies on the same data. Other identical code includes programs for file opening and closing, printing, and help systems.

—Randy Ross

1-2-3 for OS/2 2.0, Freelance Graphics for OS/2 2.0

Tight integration with OS/2 2.0's Workplace Shell and ease-of-use features make these products worth a look.

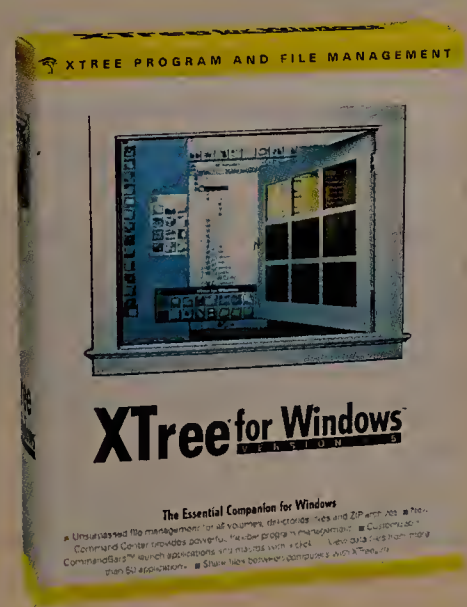
Lotus Development Corp.
800/343-5414,
617/577-8500
List price: 1-2-3 for OS/2 2.0 $495; Freelance Graphics for OS/2 2.0 $495
Reader service no. 686



Introducing XTree® for Windows™ 1.5—way beyond Windows.

Microsoft® Windows™ 3.1 is a great environment. But serious users need a utility that goes beyond the two biggest panes in Windows – the File Manager and the Program Manager. *PC/Computing* called XTree for Windows "the most powerful File Manager replacement." Now, with version 1.5, it's the best replacement for the Program Manager, too!

Enhancing Windows is one reason *PC Magazine* called XTree for Windows "one slick utility." Now, take advantage of our new program management features. You already know how useful ToolBars™ can be. We go beyond these with our unique CommandBars™: fully-configurable sets of icons that let you launch programs and run macros (with our new easy recorder and scheduler) from instant hot-buttons, anywhere in Windows! And for XTreeGold users, we've provided hot-key macros so that you can add familiar Gold commands to XTree for Windows.



Want more? How about ZIP archive handling that's as easy as drag-and-drop? Or file viewers that show you more than 50 different file formats? You can even edit text and print documents and graphic files right from XTree for Windows, without even opening the application that made the file. You'll also get full support for Windows for Workgroups.

As if that isn't enough, you also get XTreeLink, a utility that makes transferring files from computer to computer a cinch. With XTree for Windows, it's as easy as point and click!

As *Windows Magazine* said, "Usually, multi-function packages have to compromise somewhere. XTree didn't."

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and ask for offer number 135!

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Circle 237 on reader service card

A Faster dBASE Finally Gets a Compiler

When Borland bought Ashton-Tate in 1991, *dBASE* users wondered what the new company would do with the popular database, a competitor of Borland's own *Paradox*. The first *dBASE* upgrade released by Borland, last year's *dBASE IV 1.5*, was no real answer to the question—it had been developed by Ashton-Tate before the buyout, and Borland did little more than test and ship it. Now, with *dBASE IV 2.0* and *dBASE Compiler for DOS*, both of which should be shipping by the time you read this, we have a clearer view of the future. And what do we see? Better core technology, which should result in faster performance, and considerable improvements for developers, all attached to pretty much the same interface.

Faster Than a Fox

Speed is the new version's principal theme. According to Borland, *dBASE IV 2.0* performs up to ten times faster than version 1.5, and in some operations it's hundreds of times faster. The company claims that in real-life situations, the new *dBASE* is faster than archrival *FoxPro*, usually considered the quickest database. Borland made a similar claim about last year's *Paradox 4.0*, and several objective tests found it to be true.

Borland's name for the improved *dBASE* speed is WARPSpeed, with the *WARP* standing for *wildly accelerated relational performance* (look, folks, we don't make these things up—we just report them). Despite the fancy title, there really isn't a revolutionary new technology involved; Borland has made a number of large and small changes that, taken together, should improve overall performance. These include a new math engine, high-performance filters, and user control of how indexes use RAM.

Runs in Protected Mode

One thing that almost always improves performance in a large application is memory management. In order to directly access vast quantities of RAM, *dBASE IV* is now a protected-mode program, requiring a 286 and 2MB of RAM. That's a bare minimum: Borland is recommending 3MB of RAM and says that 5MB is required for optimal performance. With less, *dBASE* uses a swap file on your hard disk for virtual memory, slowing operations considerably. Version 2.0 can now access as much as 16MB of RAM.

For the applications developer, *dBASE IV 2.0* offers several new commands, most of them tools for creating user interfaces. There are commands and functions that help you control your pop-up menus and handle mouse events. For instance, a simple new MOUSE function can tell your program whether it's running on a machine that has a mouse driver installed. The debugger has also been improved.

When Ashton-Tate first released *dBASE IV* in 1988, it promised that a compiler for turning *dBASE* applications into stand-alone EXE programs was on its way. Ashton-Tate even promised that the compiler would be free to anyone who bought the special *Developer's Edition*. Five years and one company buyout later, the compiler is finally here. And yes, Borland is making it available free to all registered *dBASE IV Developer's Edition* users.

Borland built its reputation on compilers, so the prospects for this one look good.

For instance, you can create large EXE files that include the run-time file and can be split and then rejoined or multiple small EXE files that can share a separate run-time file. A C-like preprocessor lets you do conditional compiles and simplifies many burdensome programming tasks. Borland promises that *dBASE Compiler for DOS* is fully compatible with *dBASE IV*—a claim that will be put to the test a thousand times over as people begin to use it.

dBASE IV 2.0 costs $795; upgrades are $99.95. *dBASE Compiler for DOS* costs $495 (it's free to registered users of *dBASE IV Developer's Edition*). With these new products, Borland is clearly making *dBASE* a more hospitable environment for developers. We'll have to wait and see what they do for users next time around.

—Lincoln Spector

dBASE IV 2.0 HAS MORE THAN 30 new and enhanced functions that let you create Windows-like applications. With overlapping windows, drop-down menus, and pop-up boxes, your dBASE IV apps are easier to use.

dBASE IV 2.0

Better performance and some language enhancements characterize Borland's first homegrown dBASE.
List price: $795, upgrades $99.95

dBASE Compiler for DOS

Turn your dBASE applications into self-running EXE programs with this long-promised compiler.
List price: $495 (free to registered users of Developer's Edition)

Borland, Int'l
800/331-0877,
408/438-8400
Reader service no. 687

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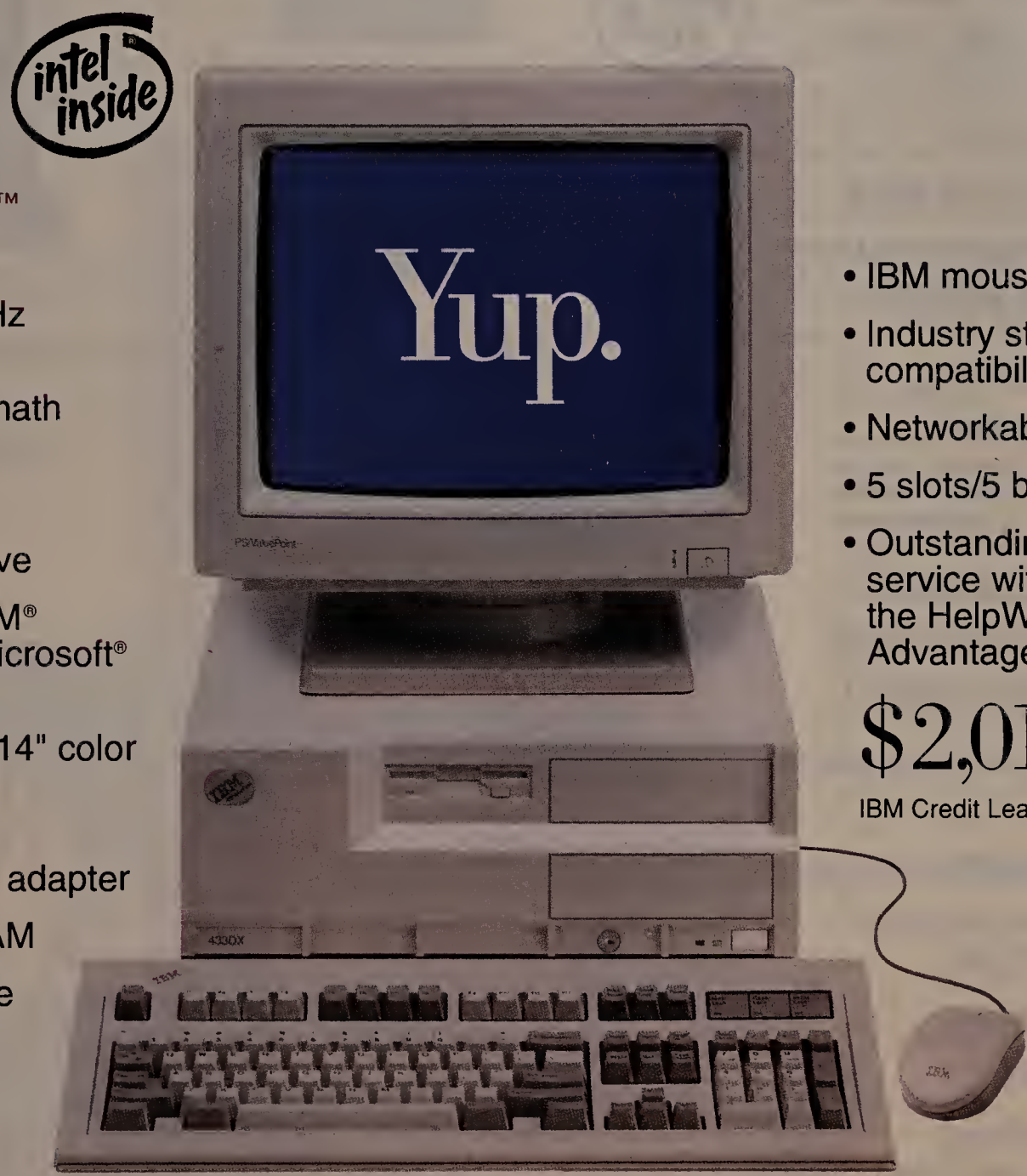

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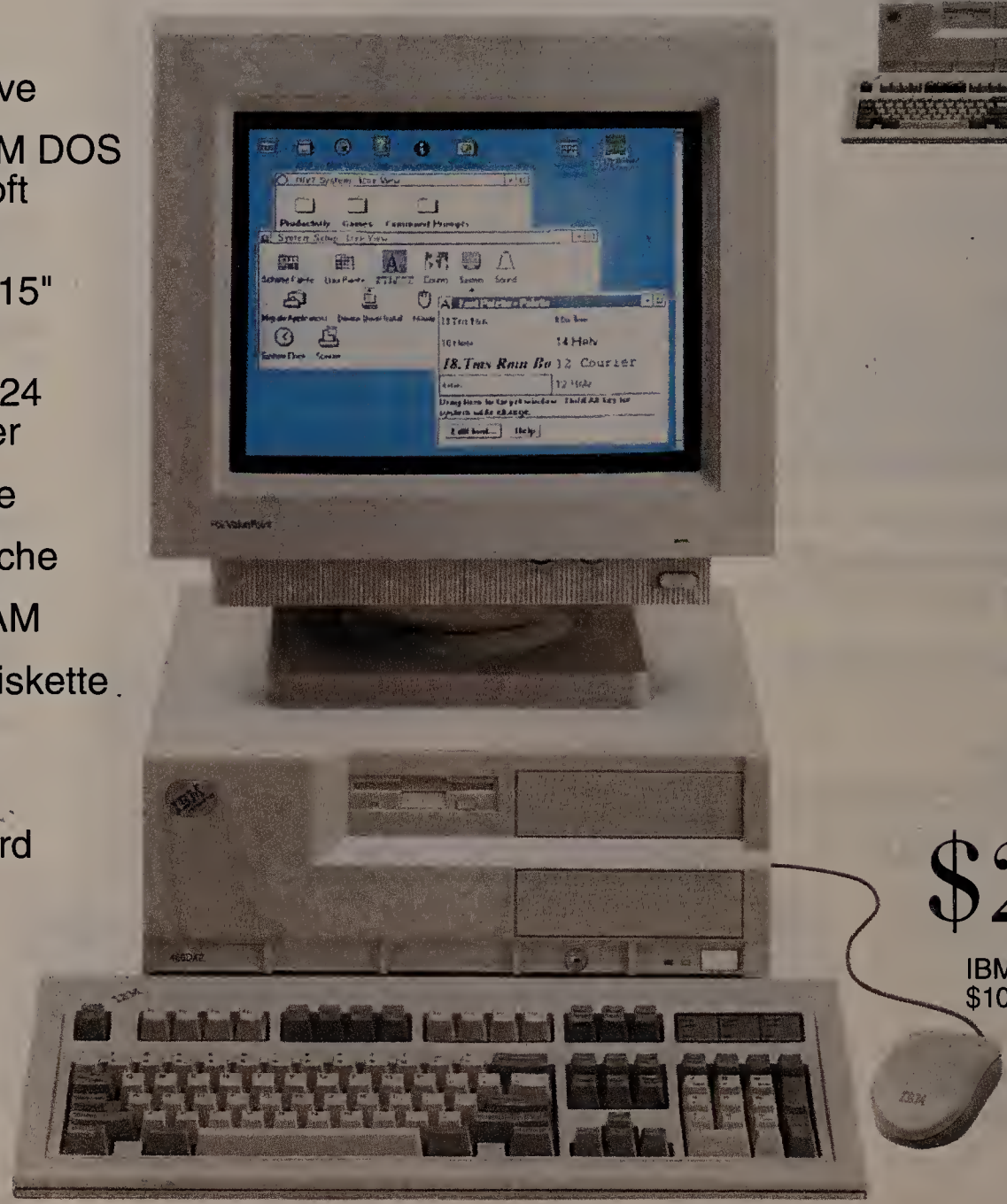

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***Screen at right depicts OS/2, also available pre-installed on this model.
†ThinkPad 300 and 700C systems and options are manufactured in Japan. PS/ValuePoint 6312, 6314, and 6319 Color Displays are manufactured in Korea. PowerGraph X-24 graphics adapter is manufactured in Mexico.
††PRODIGY will not run without a modem. A modem is not included with the ThinkPad 700C. A customer who acquires a ThinkPad 700C and a modem which operates at a speed below 9600bps may contact PRODIGY to obtain a One-Month Free Trial Membership.
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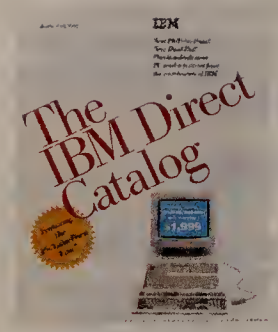

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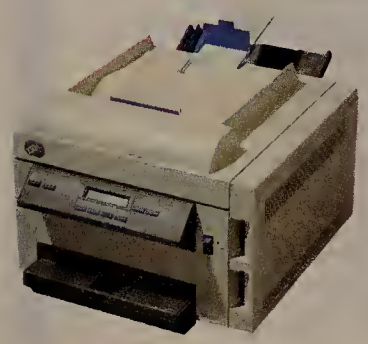

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ThinkPad 700 and 700C Options	**Price***
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hDC Upgrades Enhanced Commands and Other Tools

REDOING YOUR DESKTOP: Windows Express puts your work into folders and lets you create complex commands. Thanks to Windows Express, the After Dark image in the background actually moves.

hDC Computer Corporation has just released major updates to two very different *Windows* utilities, *Windows Express* and *FirstApps*. *Windows Express 4.0* is a program-launching environment that lets you organize your applications into folders, while *FirstApps 2.0* is a collection of 20 small programs intended to make *Windows* more powerful, more convenient, or simply more aesthetically pleasing.

Despite the programs' differences, the upgrades share one major new feature: *enhanced commands*, borrowed from hDC's *Power Launcher*. An enhanced command is a set of detailed program-launching instructions, created via a special dialog box, that can load multiple applications, control where they'll go on screen, pop up dialog boxes, and run a few macro commands such as minimize and print.

Launching From Folders

Windows Express uses a file-drawer metaphor to help you organize your work by project. You create folders in which you place application items that can perform functions such as launching a program or launching an associated data file. These can be combined with an enhanced command to perform more complicated tasks, such as printing documents. You can also place folders within folders.

In addition, *Windows Express* has added a status bar, as well as a task list option on the main menu, giving you easy access to every other program you're running. One of *Express*'s major flaws, the separate Editor program you must run to change folders is still there, although it's been improved to some degree—you can now move directly from *Express* to the editor with a single command.

You're bound to like some of the *FirstApps 2.0* programs, if not all of them. Among the more practical utilities are a *PKZIP 1.x*–compatible compression program; instantly accessible tools for copying, moving, and deleting files; a launcher built around enhanced commands; and memory, resource, and disk gauges.

Fun Stuff

There's also an image scrapbook, a greeting card designer, and a space game. One program lets you replace your static wallpaper with something more dynamic, including animated *After Dark* screen-saver modules or—for the more practical—an interactive calendar you can write appointments to.

Like most hDC products (*Express* is an exception), *FirstApps* enhances the control menu in the upper left corner of every program window, placing extra tools in this easy-to-reach spot. Unfortunately, these programs replace the on-screen button with a bright-red, distracting hDC logo. Keeping the benefits of the hDC control menu without the annoying visuals takes some tinkering.

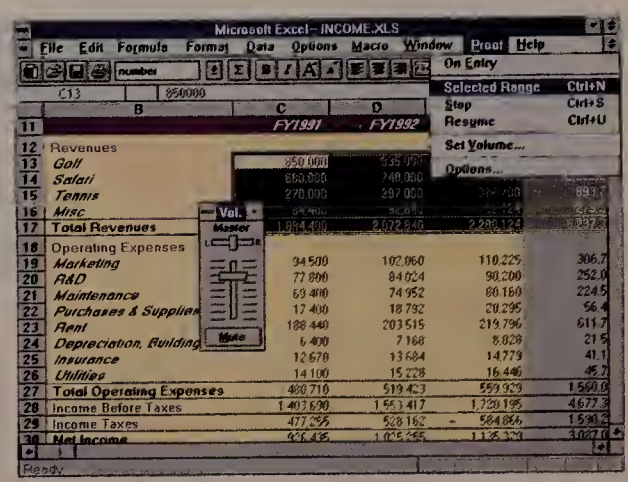
—Lincoln Spector

Windows Express 4.0, FirstApps 2.0

WINDOWS Two very different hDC utilities add power through the same versatile program-launching technology.

hDC Computer Corp.
206/885-5550,
206/881-9770 (fax)
List price: Windows Express 4.0 $99.95, FirstApps 2.0 $99.95
Reader service no. 688

What business does sound have in a computer?



For starters, you can increase your productivity when you proof spreadsheets with the new Microsoft® Windows™ Sound System. Just highlight a series of numbers or words on the screen and it will read them back to you. It will even read them aloud as you enter them, if you like. To hear more, turn the page.

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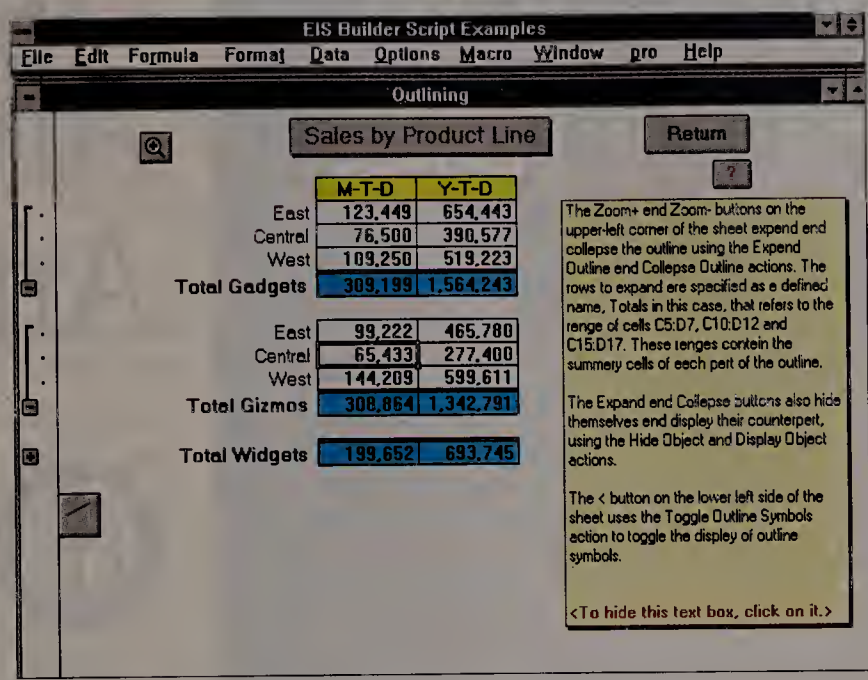
Microsoft's EIS Opener: Database Reporting With Style

It's happened at one time or another to everyone: Twenty minutes into a two-hour business presentation and you're fighting gravity's grip on your eyelids. After what seems like countless trend-tracking charts and goal-outlining overheads, the only question in your mind is, So what?

Unfortunately, although businesses have always sought to maximize data storage on their computers, not all devote the same resources to making sense of that data. The result can be a statistical soporific. The cure: executive information systems (EIS). These applications let managers locate and report data. Until now these programs have provided only one view of the information—a view that may not meet the needs of everyone in an organization. With *Open EIS Pak*, Microsoft hopes to redefine EIS as an enterprise information system that at last serves every employee's information needs.

Open EIS is an *Excel* add-on that lets corporate applications developers generate complex spreadsheets and macros and then link them to data files on a network server to provide custom search capabilities and ad hoc analysis and reporting.



MICROSOFT'S OPEN EIS PAK is an Excel add-on that lets corporate developers create reports tailored to the needs of different end users.

Attaching Buttons

For power users and corporate developers, *Open EIS* makes life easier by offering a selection of menu options that convert directly into code to create a front end to *Excel*. These options can be as simple as a few additional buttons or as complex as a new interface with an array of custom-made buttons and switches. For users, report generation becomes a point-and-click affair: Need more detail on a pie chart showing sales by region? Just click on the slice you want to explore, and the program will present the next level of detail.

Tailoring Reports

Open EIS seamlessly integrates all of a company's *Windows* applications and tools to deliver live data to end users in a format they can use. Corporate developers can integrate a firm's database with a department's spreadsheet and tap *Windows* tools, including OLE, to embed graphics in the reports that are automatically updated whenever a user requests the latest data from the file server.

For instance, say you're a manufacturer whose sales, accounting, and production departments receive quarterly reports and tables that list sales and profits nationwide as well as by region, state, and product category. There's no easy way to tailor the report to everyone; accounting needs information on receivables, the sales department needs geographic revenue trends, and production needs to know which product nationwide is selling best so it can gear up for manufacturing. With *Microsoft Open EIS Pak*, corporate developers can create option buttons, such as By Region or By Product. Users just click on the button to call up both the data and the corresponding charts they need.

Priced at $99, *Microsoft Open EIS Pak* could pay for itself within hours of its installation.

—Richard Melville

Microsoft Open EIS Pak

WINDOWS A flexible Information system that lets you customize data reporting and perform ad hoc analysis.

Microsoft Corp.
800/227-4679
List price: $99
Reader service no. 691

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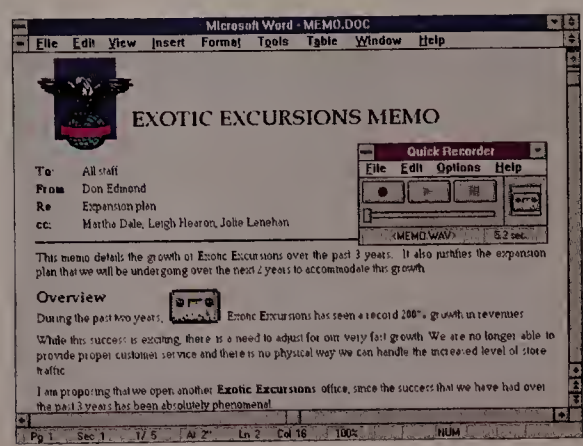

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Folio Views: Quick Access to Frequently Changing Information

Folio Views 3.0 is a combination document/image manager and database that stores important business information, such as sales reports, policy manuals, and engineering data, in a single-file "info base" on a network, making it easier for your employees to add, edit, and retrieve data.

Useful for businesses that manage frequently changing information, *Views 3.0* runs in many network operating environments, including NetWare, VINES, and *LAN Manager*. Previously available only for DOS, *Views* now includes a *Windows* version.

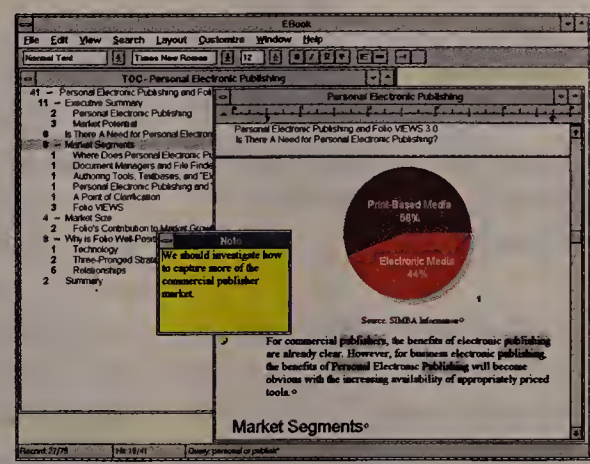
You can use *Views* to import documents from the DOS and *Windows* versions of *WordPerfect* and *Word*, retaining the documents' format. You can also import *Views 2.1* and ASCII files.

Views indexes every word it receives and compresses each file to approximately 50 percent of its original size. As many as 125 users can simultaneously access and edit records in a *Views* info base—a boon to customer service or sales organizations that must handle constantly changing data. You can store graphics, animation, and audio and video files as objects within an info base and link them with documents, which is useful for on-line technical manuals. Also, you can register external documents with *Views* so that the program can search for documents not stored in its info base.

Views 3.0 includes a variety of editing tools, plus undo functions and a user-modifiable spelling checker based on *The American Heritage Dictionary*.

Views 3.0 costs $495 per user. A scaled-down version, *Views 3.0 Lite*, costs $195 per user and lets you view, search, and make document annotations.

—Jeff Bertolucci



FOLIO VIEWS 3.0 stores documents in a single-file "info base" on a network server.

Folio Views 3.0, Views 3.0 Lite

WINDOWS A LAN-based repository for storing documents. DOS and Windows users can edit, add, and retrieve information stored in a Views info base.

Folio Corp.
800/543-6546,
801/344-3700
List price: Folio Views 3.0 $495; Views 3.0 Lite $195
Reader service no. 693

Crystal-Clear Database Reporting

A successful software upgrade can be judged by two personal criteria: "Does it do more for me?" and "Does it do it faster?" Crystal Services, with the release of *Crystal Reports 2.0*, a major upgrade of its *Windows* data access and reporting tool, answers positively to both.

Designed for power users and corporate developers, *Crystal Reports 2.0* offers a raft of features to create tools that enable any user to become an effective report writer. Improvements include multiple field formatting, which takes care of such issues as dates and currency, as well as font selection for data field presentation. There's also improved line and box drawing with color support, so reports will have that professional, polished look. Two-pass reporting makes *Crystal Reports 2.0* an ideal engine for those users who generate sorted and grouped reports.

The single-user version of *Crystal Reports 2.0* has a list price of $195, and a LANPak for up to five simultaneous users is available for $395.

—Richard Melville

Crystal Reports 2.0

WINDOWS Upgraded database report generator combines power, flexibility, and ease of use.

Crystal Services, Inc.
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List price: single-user version $195, five-user LANPak $395
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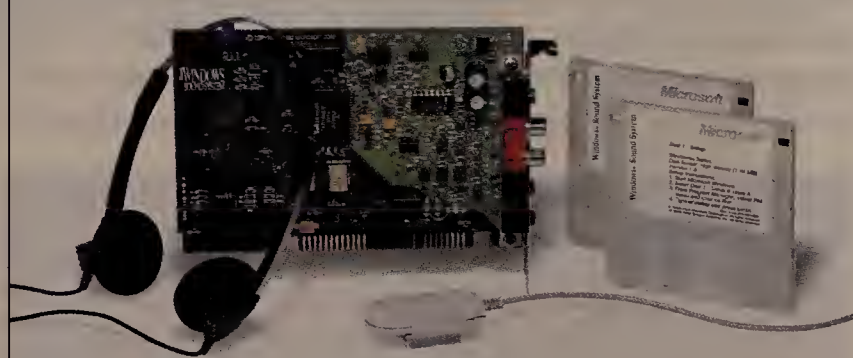
Microsoft Windows Sound System. You'll be hearing a lot about it.



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At Last: XyWrite 4.0 Arrives With Power

XyWrite 4.0
A welcome upgrade for professional writers who haven't adopted a Windows word processor.

The Technology Group Inc., XyQuest Division
410/576-2040,
410/576-1968 (fax)
List price: $495, upgrade $99
Reader service no. 694

You can tell a lot about people from their choice of word processing software. For example, if you've been using *XyWrite*, you're probably a publishing professional, perhaps a writer or editor, who values the speed of this DOS program over the graphical and ease-of-use features offered by *Windows* products. You're also very loyal and very patient.

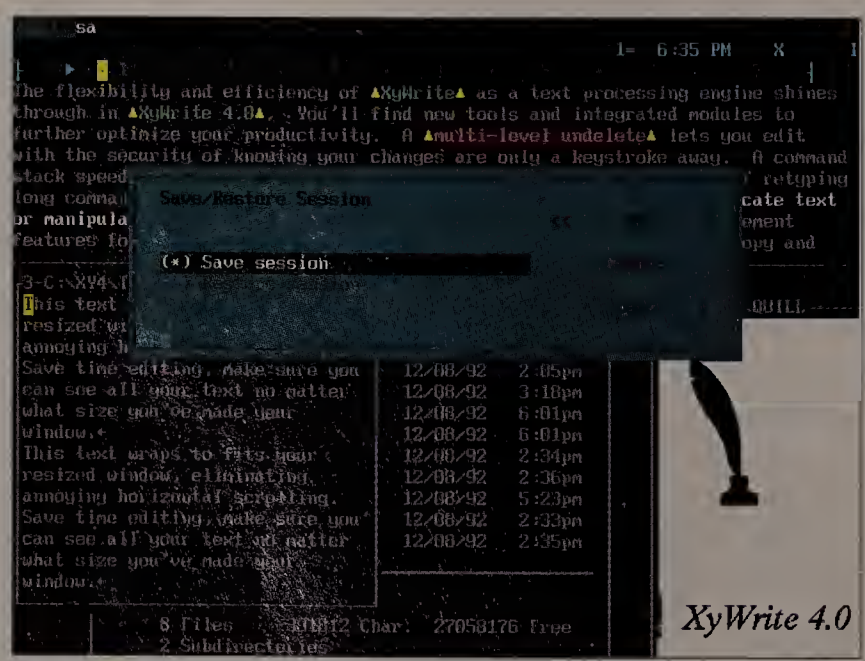
XyQuest, the original developer of *XyWrite*, tested users' loyalty and patience by joining forces with IBM in 1991 to introduce a graphical word processor known as *Signature*. This product lacked the performance and spelling checker features of XyQuest's previous product, *XyWrite III Plus*. As a result, many *XyWrite* loyalists never upgraded.

For these users, the wait is over: XyQuest, which was recently purchased by The Technology Group, has introduced *XyWrite 4.0*. The $495 product ($99 for an upgrade and $129 if you're upgrading from a competitor's word processor) offers improvements in performance and dozens of new commands and ease-of-use features.

On the performance end, the new product supports expanded memory, which means faster scrolling through large documents. Other niceties include a multilevel undelete buffer that makes it easy to retrieve accidentally deleted text. A command stack feature stores command-line activities, so you don't have to retype long commands such as complex search-and-replace strings. The search-and-replace feature itself has also been improved; it now accepts AND, OR, and NOT commands. *XyWrite 4.0* includes bookmark features that are similar to those offered by other word processors. A save-and-resume feature enables you to save up to nine windows or documents, quit, reload, and then return to the same setup as before. Keyboard jockeys will appreciate the little things, such as the word-, letter-, sentence-, or paragraph-transpose feature that you invoke by pressing the tilde and specific number keys together.

A WYSIWYG view option borrowed from *Signature* takes the guesswork out of formatting text and documents. This feature is particularly important because the product includes enhanced desktop publishing features that let you create borders and insert frames for text or imported graphics. A *Windows*-like interface features drop-down menus to help novices get up to speed. A keyboard recording feature converts keystrokes into macros.

—Randy Ross



WITH XYWRITE 4.0, you can save up to nine windows or documents, quit and reload, and return to the same configuration as before.

Mind Your Own Business Better

Pro Forma
WINDOWS A flexible financial modeling tool for business planning.

Spreadware
619/347-2365,
619/347-6045 (fax)
List price: $389
Reader service no. 692

Let's face it: Few people start a business out of a love for balance sheets or financial statements. However, as anyone who has ever applied for financing can attest, banks and investors respond much more favorably to a well-constructed and well-conceived business plan than to plain enthusiasm and dedication.

Enter Spreadware's *Pro Forma*, an *Excel* add-in that uses your company's basic business information to construct pro formas (standard business financial statements). The program can also serve as a financial modeling and planning tool.

To get started with *Pro Forma*, you provide the program with basic financial information about your business. *Pro Forma* then uses this data to construct a model of your company's financial future, projecting performance during the next decade and generating detailed monthly, quarterly, or annual financial reports. If the fiscal picture looks less than rosy, you can perform quick what-if analyses. By watching how changes in individual expenses and revenues would affect your business over time, you can identify potential strengths and weaknesses.

Perhaps most important, *Pro Forma* handles all these tasks without asking much of you. Program installation and start-up are quick and easy. Once installed, a *Pro Forma* option appears on the *Excel* menu bar, providing point-and-click access to what-if analysis and reporting. You can tailor the level of forecasting or run a default model. At $389, *Pro Forma* can put big-business–style information at the fingertips of the small-business owner.

—Richard Melville

6 steps to healthy computing

1. Curtis Glass Filter Plus —
Relieves eye strain and fatigue, cuts glare up to 99%, and reduces VLF radiation up to 98%.

2. Curtis Monitor Arm —
Positions and adjusts monitor to optimum viewing angle to reduce glare and improve posture. Both arm and platform swivel 360°.

3. Curtis Keyboard Organizer —
Keeps supplies in reach and relieves tired, aching wrists with built-in wrist rest. (Wrist rest also available separately.)

4. Curtis Clip —
Holds copy next to monitor to reduce eye fatigue and neck strain by eliminating constant refocusing from desktop to monitor.

5. Curtis Wrist Rest —
Supports wrists at a more comfortable height to help reduce pain and fatigue.

6. Curtis Mouse Pad Organizer —
Built-in wrist support relieves sore, tired wrists. Pad improves pointing accuracy and pen/pencil tray organizes supplies.

Curtis offers many practical and low cost accessories that can reduce everyday physical stress and strain from computing.

Long periods of highly routine computing can harm your physical and mental well-being. That's why Curtis offers an entire family of ergonomic accessories to improve your computing health and comfort.

Choose from eye-saving Copy Clips and Glare Filters, wrist-saving Keyboard Organizers with Wrist Rests, and posture enhancing Monitor Arms. In no time, you'll be able to feel the difference these innovative Curtis accessories make in your personal computing comfort and well-being.

So why wait any longer? Six simple steps you can take today can mean more energy, greater productivity, and more job enjoyment tomorrow.

For more information, call Curtis at 1-800-955-5544, Ext. 240.
Ask for your free "Healthier Computing Guide" brochure.

Manufacturing Company, Inc.
CURTIS
30 Fitzgerald Drive, Jaffrey, NH 03452

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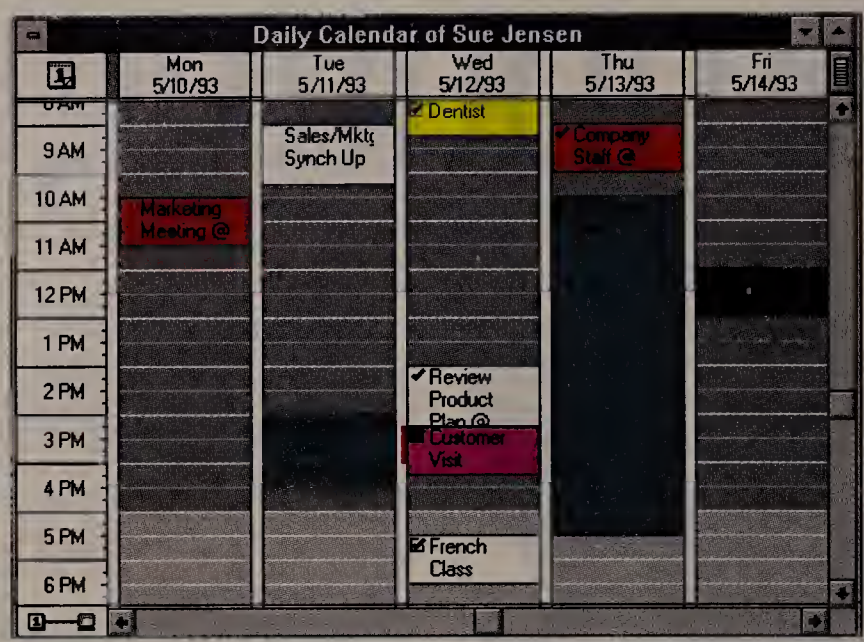
Meeting Maker Makes Things Happen



THE DAILY CALENDAR IN MEETING MAKER XP displays all your meetings, work activities, and personal appointments.

You might already have heard of *Meeting Maker*, the best-selling scheduling software on the Macintosh market. Now On Technology has introduced a *Windows* version of *Meeting Maker*.

Meeting Maker XP (the *XP* stands for *cross-platform*) runs on NetWare-networked *Windows* PCs and AppleTalk-networked Macintoshes where one workstation, either a PC or a Mac, is the scheduling server. It lets you keep track of your personal schedule and easily book and confirm meeting times, places, and attendees. With daily, weekly, and monthly calendar views and to-do lists, *Meeting Maker*'s interface looks like the average Day-Timer.

Meeting Maker comes with most of the requisite features you might expect in a good group scheduler. The Propose Meeting feature lets you select a meeting time, invite guests, reserve a room, and prepare an agenda. By double-clicking on the meeting time, you can check to see who's coming, who's not, and who's not sure yet. When you want to locate a free time slot, you can view all your colleagues' calendars at once or use the Auto Pick feature to automatically find the first available slot. You can create a to-do list that prioritizes tasks and keeps sensitive appointments discreet by hiding them from view.

One thing that makes *Meeting Maker* a little different is that it can help you manage projects as well. For example, you can set up a to-do list for an entire group, delegating tasks, setting due dates, keeping notes, and tracking the status as you go. And unlike group schedulers that are limited to certain E-mail packages, *Meeting Maker* runs regardless of your E-mail system.

Meeting Maker XP doesn't take all of the pain out of setting up meetings, but it does make meeting making easier. The package comes in 5-, 10-, and 50-user packs. The 5-user version costs between $500 and $700; prices for the 10-user and 50-user versions have not been set. Volume purchases and site licenses are available.

—Bronwyn Fryer

Meeting Maker XP

WINDOWS The best-selling group scheduler on the Mac market comes to Windows.

On Technology
800/548-8871,
617/876-0391 (fax)
List price: 5-user version between $500 and $700
Reader service no. 695

Personal Travel Guide: Don't Leave Home Without It

You started this business trip with champagne dreams and no-traffic wishes, but now they've fizzled. Your crumpled map isn't guiding you very well, and it can't help you find a store that carries the computer accessory you need or a parking garage for an unscheduled stop. *Personal Travel Guide* navigation and travel information software is designed to solve these everyday travel hassles.

To get you on the go quickly, the program uses a *Windows*-like interface with feature-rich drop-down menus and a helpful tool bar. Each city's database (sold separately) takes up 4MB to 5MB of space, but they can be compressed.

Using a city map is simple: To get from point A to point B, choose the Directions menu; click on your location or type it in, and enter a destination. The program draws the route on the map and provides street-by-street directions, mileage, and approximate travel time. If you want to use public transportation, the directions denote bus, train, or subway routes, with all the stops on the way plus schedules and fare information.

An "electronic yellow pages" feature provides comprehensive info from a pulldown menu. For example, you can find the perfect jazz club (and its dress code), a golf equipment store, or the closest theater.

Other lifesavers: To find the closest cash machine, click on the money icon in the tool bar. A convention guide lists all the city's meeting rooms and their capacity. You can store personal information like client notes, phone numbers, and addresses in the product's organizer.

Databases should be available as of April for San Francisco, Sacramento, Chicago, Orlando, and Washington, D.C. Thirty-five more are planned by year's end. With *Personal Travel Guide*, you'll say good-bye to some of the hassles of travel.

—Laurianne McLaughlin

Personal Travel Guide

Map and travel software with a yellow pages–like feature.

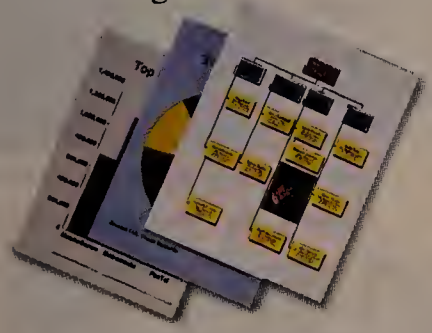
Personal Travel Technologies, Inc.
800/345-8501,
516/877-1234
List price: Including one city database $299.95, each additional city database $149.95
Reader service no. 689

LEARN A GRAPHICS PROGRAM

Now that you're zipping right along with Windows, you don't need graphics software that will slow you down. Thank the PC gods for Graphics Works™ for Windows, the easy-to-learn, shockingly inexpensive yet surprisingly complete package that instantly removes drab from any and all documents.

One minute you're breaking open the box. The next, you're cranking out everything from serious business presentations to eye-popping posters.

If you want a simple bar graph, no sweat. If you want a 3-D bar graph punched up with a photo or maybe a perky little illustration, no sweat. The point is that this package is so simple, you actually enjoy being creative, whether you're doing presentations, invitations, publications, posters, layouts, or logos.

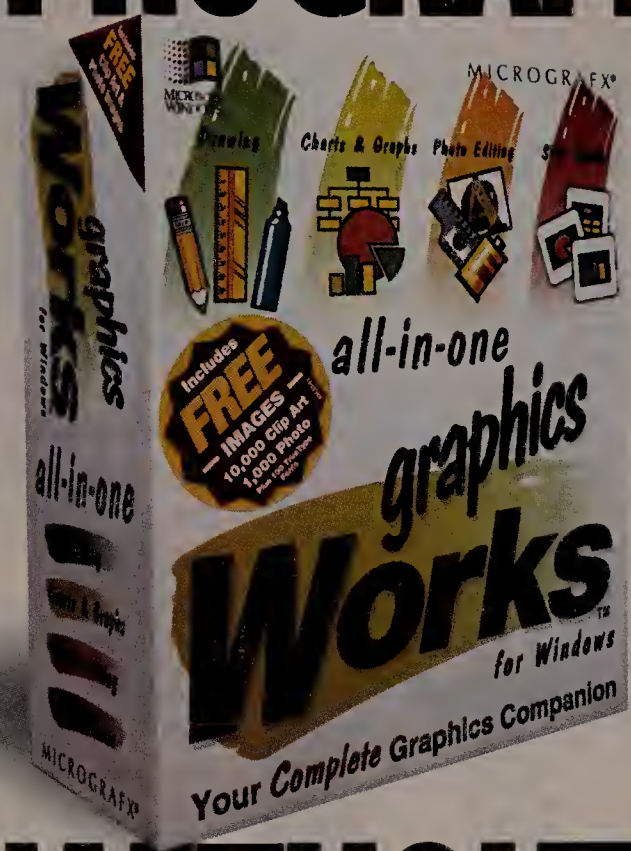


Pie charts, organizational charts, and graphs can be as straightforward or as wild as you need. Either way, creating them is fast and simple.

Create your own artwork with simple-to-use drawing tools. Or choose from over 11,000 photo and clip art images, many on CD-ROM, that you can easily customize. You can even retouch photo images right on your screen, or scan in your own. Everything works in the same no-brainer way, with one-click function selection

Over 11,000 photos and clip art images are just waiting to jump out and be used as is, or easily customized for whatever purpose you can think of.

and help screens. So you have all the tools you need to complement your Windows word processor, spreadsheets, or presentation programs. And you can start using it the minute you open the box. It's that easy. After all, Graphics Works for Windows is designed to make your documents colorful, not your language.



WITHOUT USING GRAPHIC LANGUAGE.

PICTURE YOURSELF SAVING

BIG MONEY.

For a limited time, any owner of a qualifying Windows word processor or graphics software package can upgrade to Graphics Works for only $129, regularly $295.

Qualifying Packages Include: Microsoft® Word® for Windows, WordPerfect® for Windows, Lotus® AmiPro,® Microsoft® Works® for Windows, Harvard Graphics,® Lotus® Freelance Graphics,® Aldus® Persuasion,® any Micrografx product and other similar packages.

—$129—

See your local software dealer or call Micrografx today to see if you qualify,

1-800-998-0158.

M I C R O G R A F X®

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Circle 179 on reader service card

Remote-Control Software for Every User

Two new *Windows* products could help transform remote-control software from esoteric to invaluable. The packages let you control a PC from another one at a different location with greater ease and performance than older, non-*Windows* programs would give you. Typically, you'd use these new products with high-speed (9600 bps or higher) modems from a PC in your home or hotel room to access or transfer files stored on your office PC.

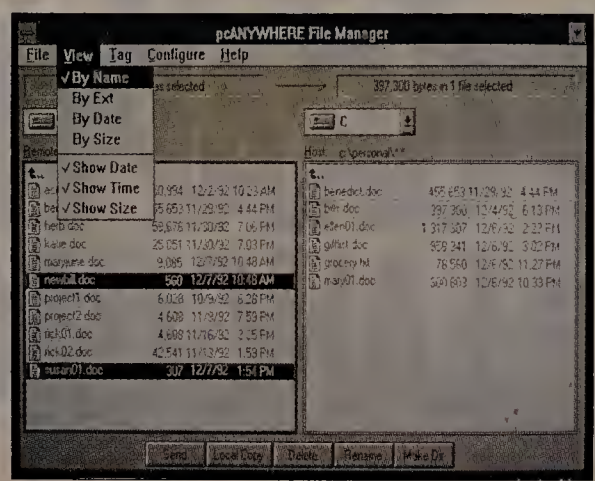
Microcom's $199 *Carbon Copy for Windows 2.0* addresses many of the criticisms of the previous version. To speed up data transfers, Microcom added data compression that it claims can cut the amount of time required to send a file by half. In addition, the program improves the remote performance of DOS products by letting you exit *Windows* to run them. *Carbon Copy for Windows 2.0* is compatible with the DOS version of *Carbon Copy*, so you can dial in to (but not from) a DOS PC. Microcom beefed up security by adding an event log that tracks connections, file transfers, and remote-control sessions. This feature lets you know who is logging on to your computer and what information they're accessing.

Microcom also added networking features. Version 2.0 lets you take remote control of PCs on a Novell network. This means your PC support staff can fix problems and upgrade software without leaving their desks. A separate feature lets you dial in through the network modem pool, so you won't need to have your own high-speed modem attached directly to your office computer.

Carbon Copy for Windows has always been easy to use, and now it's even easier. A remote clipboard lets you cut or copy and then paste to a remote application; otherwise, you'd have to send the data as a separate file. There's a unique automatic callback feature: Previously, the product requested a password, hung up, and then called a designated telephone number. This feature was great for security and for reversing phone charges, but if you were traveling, your phone number changed from hotel to hotel, and the feature was limited. A new roving option allows you to enter a password and then specify any phone number that you would like the system to call.

CARBON COPY FOR WINDOWS 2.0 offers a callback feature that requests a password, then calls the number you've specified locally or remotely.

For high-end graphics users, the new Virtual Desktop feature makes communicating with systems sporting high-resolution displays easier. Without it, if your notebook has an 800-by-600-pixel display and dials a desktop with a 1024-by-768-pixel display, you won't be able to see the entire screen on the lower-resolution device without scrolling around, a time-consuming exercise. This new feature creates a minimized version of the high-resolution display and provides a tool that lets you zoom in on the exact area you want to see.



PCANYWHERE 1.0 FOR WINDOWS' split-screen interface simplifies file transfers.

pcAnywhere

Symantec's *The Norton pcAnywhere 1.0 for Windows* is a full-blown communications program offering a complement of remote-control features as well as popular terminal emulation capabilities that let you dial in to BBS's and on-line services like CompuServe and MCI Mail. It also includes its own scripting language and editor for automating common tasks. (*Carbon Copy* doesn't offer its own language, but it provides DDE linking that lets you automate tasks using other programs, like *Visual Basic.*)

Among the remote-control features *pcAnywhere* offers that *Carbon Copy* does not: data encryption that provides additional file transfer security, and a data/voice-switch feature that lets you interrupt a data session to speak with a person on the other end and vice versa.

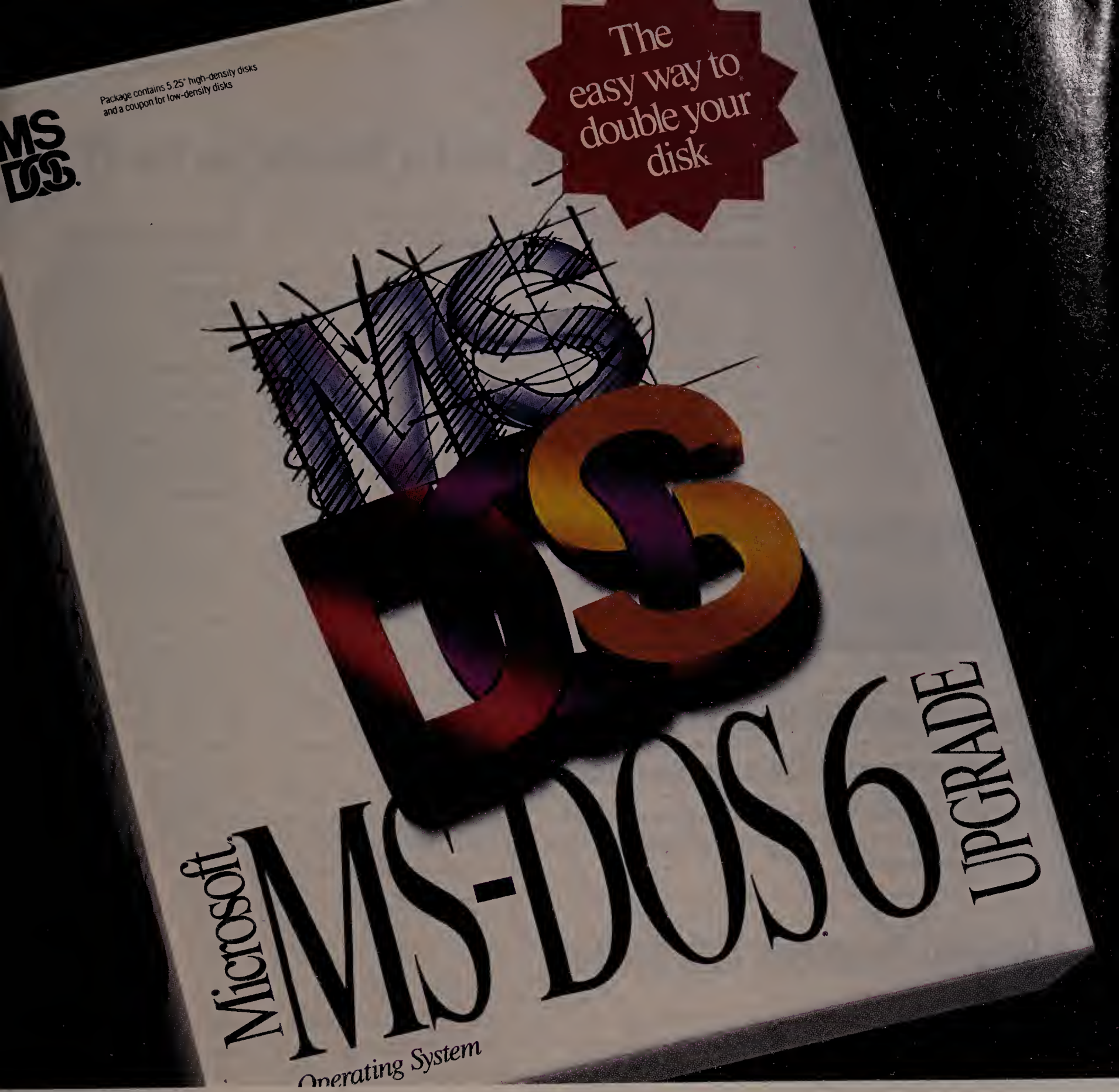
—Randy Ross

Carbon Copy for Windows 2.0, The Norton pcAnywhere 1.0 for Windows

WINDOWS Two applications that make remote computing easy and fast.

Microcom
800/822-8224,
617/551-1001 (fax)
List price: $199,
upgrade $49
Reader service no. 696

Symantec
800/441-7234
List price: $199
Reader service no. 697



YOUR HARD DISK JUST GOT DOUBLE THE ELBOW ROOM.

All those files and applications you've accumulated won't cramp your style anymore. Now our integrated disk compression doubles your disk space. Easily. Invisibly. Safely.

Simply type it in and your disk has double the space.*

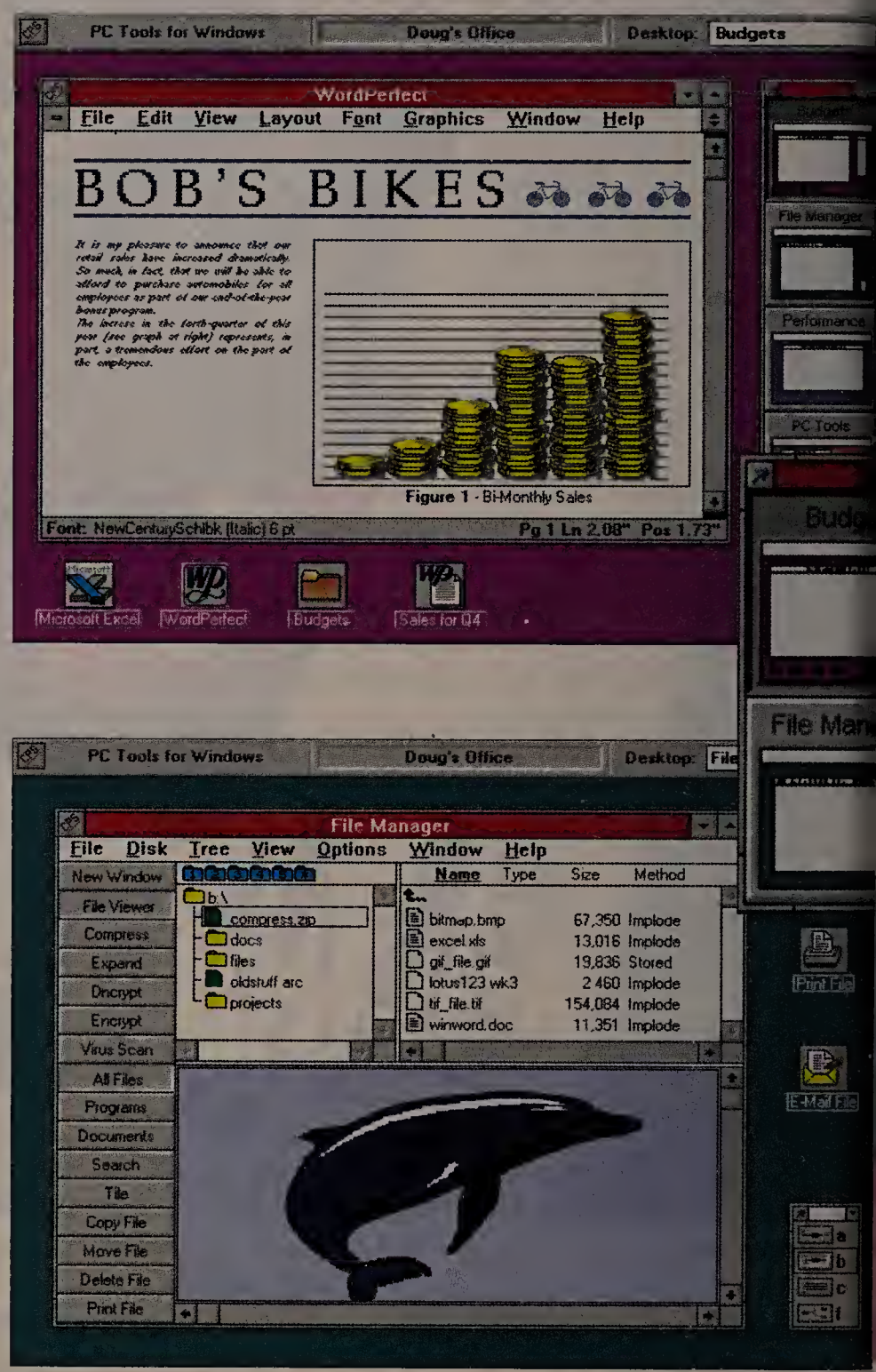
And our improved memory management lets you extend your memory with just a few keystrokes. We've even added great new features like backup, anti-virus and undelete tools for users of both MS-DOS® and Microsoft® Windows.™

So if you need more space, integrated disk compression in the MS-DOS 6 Upgrade operating system makes it easy to stretch out.

Microsoft
Making it easier

*Compression results may vary depending on system configuration. © 1993 Microsoft Corporation. All rights reserved. Printed in the USA. For more information: In the 50 United States, call (800) 228-7007, Dept. RX3. Customers in Canada, call (800) 563-9048; outside the 50 United States and Canada, contact your local Microsoft subsidiary or call (206) 936-8661. Microsoft and MS-DOS are registered trademarks and Windows is a trademark of Microsoft Corporation.

Introducing PC To
Just think of it



[1]
Organize and simplify your work.

Our unique MultiDesk desktop manager lets you put related applications, folders and files into their own separate desktops. Set up as many desktops as you like, then switch between them instantly. It all adds up to a less cluttered, more productive Windows environment that works like you do.

[2]
Improve the speed and efficiency of common tasks.

Our integrated File Manager has advanced drag-and-drop capabilities that let you quickly locate, view, copy and print files. With over 75 viewers, you can scan files (including compressed PKZIP data) without having to open their applications first. Hate to turn off your PC because you don't want to set everything up again? Our DeskSaver feature solves that problem too.

Windows® is a great product. And someday, it'll be even better. But why wait?

New PC Tools™ for Windows® is here right now. It saves you time, reduces clutter and gives you easy access to all the functions and files you use most often. In fact, PC Tools for Windows is so innovative that after reviewing it, the editors of PC/Computing asked, "Who needs Macs?"

For starters, there's our unique MultiDesk™ desktop. MultiDesk is an intuitive desktop manager that lets you organize your work by creating as many desktops as you need for your projects, tasks, or clients. So, if you spend the day switching between many different projects, you won't lose anything in the clutter.

Ever misplaced a file or couldn't remember its

*Our lawyers said we could run this headline if we make the following absolutely clear: Windows is a trademark of Microsoft Corporation. PC Tools for Windows is the sole product of Central Point Software, Inc. Microsof
Central Point,® PC Tools,® MultiDesk,® WinShield,® Speed Keys,® System Consultant® and DiskFix® are trademarks of Central Point Sof

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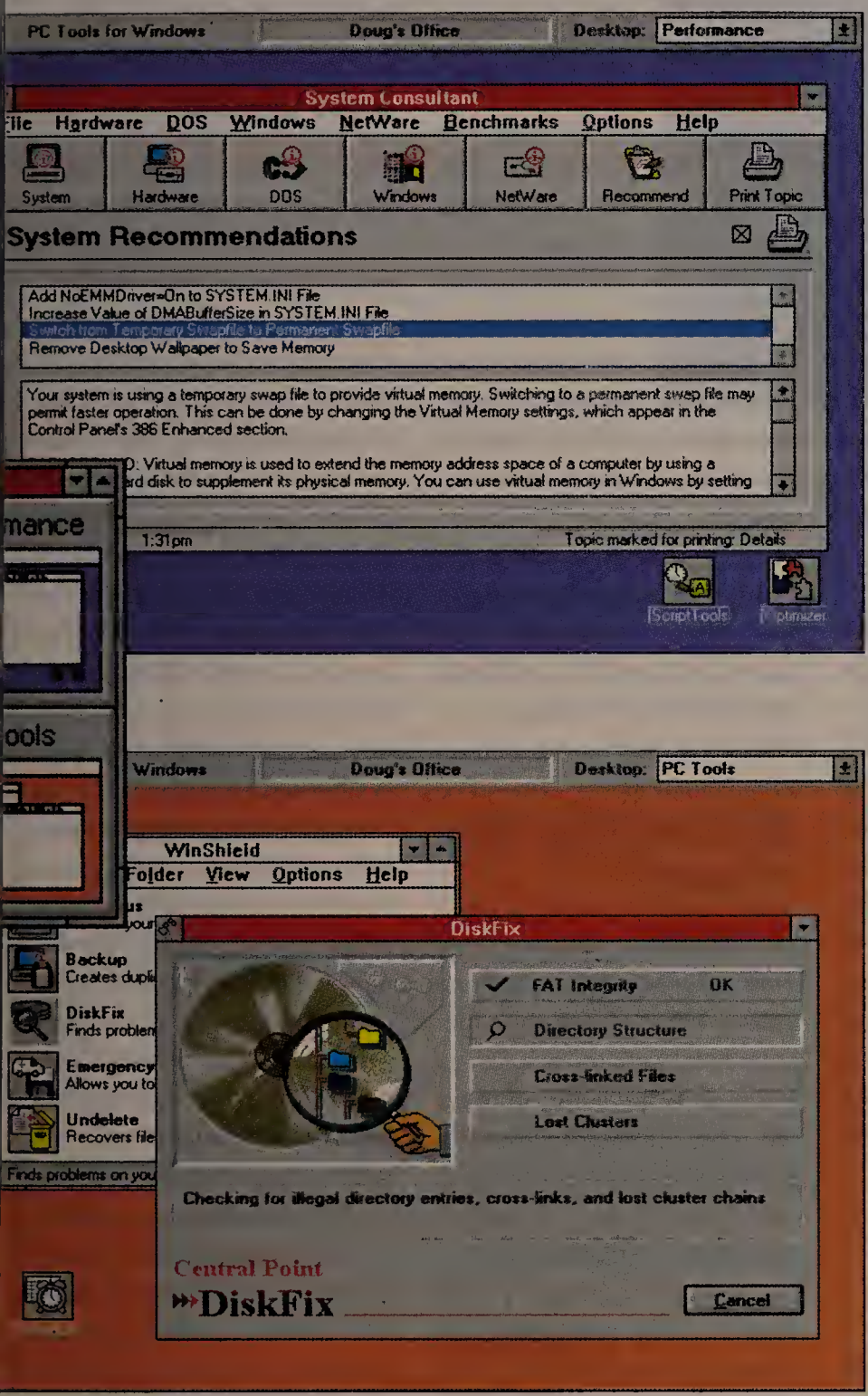
as Windows 4.0.*



[3]

Enhance your system's performance.

System Consultant™ performs over 400 system checks and provides recommendations for improving your PC's performance. Our Disk Optimizer can automatically defragment your hard disk at prescheduled intervals, or on command.

[4]

Automatically protect your data.

We've included new Windows versions of Backup, Undelete, Anti-Virus and DiskFix.® They're all integrated in WinShield,™ an automatic data-protection system that results in worry-free computing. Our Emergency Disk builds a bootable recovery disk to help get a crashed system up and running fast.

name? Our File Manager lets you quickly view files without having to load the program first. Tired of cryptic, abbreviated file names? Now you can attach long file names to your data to keep things clear and simple.

We also created Speed Keys™ so you can take shortcuts through Windows, and System Consultant that gives you specific tips for improving system performance.

PC Tools for Windows is at your nearest dealer.

For more information, a free demo disk, or to upgrade from PC Tools for DOS, call us at **1-800-759-1805**. Your purchase is backed by our 60-day guarantee.

Find out for yourself why the editors are already heralding PC Tools for Windows as "The ultimate desktop." It may just be the best thing since, well...Windows.

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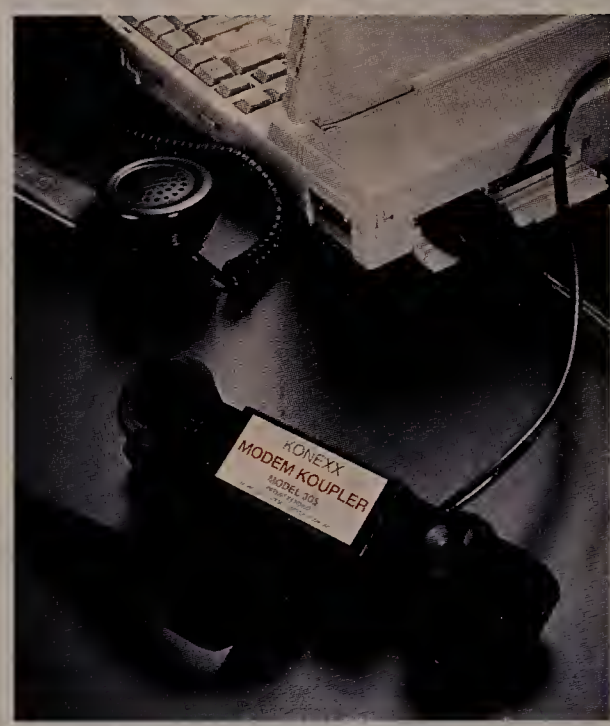
Circle 52 on reader service card

Konexx Koupler Model 305

"%$#&, I forgot the modem!" If you're a road warrior, you're probably all too familiar with that curse. When you're away from home or the office, one of your biggest data communication headaches is remembering to take all the equipment with you. Unlimited Systems' new acoustic coupler gives you one less thing to worry about—it comes with a built-in fax-modem. The Model 305 coupler accommodates most telephones' handsets, and its internal modem exchanges E-mail at 2400 bps and faxes at 9600 bps. The user straps the coupler to the handset and plugs the coupler cable into a laptop's serial port. The coupler's modem runs off a 9-volt battery. The Model 305 has a suggested price of $299. Unlimited Systems, 800/275-6354, 619/277-3305 (fax).

Reader service no. 721



THE KONEXX KOUPLER Model 305 comes with a built-in fax-modem. You strap the coupler to the phone handset and plug the coupler cable into your laptop's serial port.

Expense It 2.1

This DOS application helps you keep on top of your business expenses and can fill out your expense reports automatically. *Expense It* lets you define how you organize and track expenses and gives special attention to IRS reporting requirements. The program comes with 8 predefined expense codes (such as hotel accommodations, meals, and auto mileage) that comply with IRS regulations. You can change these or define up to 16 more to match the expense codes to your company's expense report terminology or, if you're self-employed, to the deductions on your tax return. The program provides three forms for printing out your expenses in portrait or landscape mode with some user-definable variations, but you can also use the Custom Definition feature to make it print them onto your company's expense report form. For a fee (usually around $250), On The Go Software will design the template for you. You can transfer data into ASCII, WK1, and QIF files. In addition, the program links with Sharp's Wizard electronic organizer. *Expense It 2.1* has a list price of $129.99. On The Go Software, 714/489-4050, 714/489-1797 (fax).

Reader service no. 709

DigiBoard 2Port

The 2Port is designed for *Windows* communications and remote access to LANs. It increases throughput by using two serial ports built for high-speed communications at up to 115 kilobits per second (kbps). In addition, the card features an Intel 80186 microprocessor to relieve the host CPU of communications tasks such as background file transfers. The 2Port is useful for branch offices that frequently call in to the corporate LAN. Its serial ports help remote users get the most out of their V.32bis modems, which offer communications speeds up to 57.6 kbps (using V.42bis data compression). This product includes drivers for *Windows 3.1* and *Windows for Workgroups*. Additional drivers are in the works for Windows NT, NetWare, OS/2, and *LAN Manager*. The 2Port costs $299. DigiBoard, 800/344-4273, 612/943-9020, 612/943-5398 (fax).

Reader service no. 713

Aldus Gallery Effects: Classic Art, Volume 2

WINDOWS Volume 1 of *Aldus Gallery Effects* excited users with its ability to render ordinary scanned images in charcoal, watercolor, mosaic, and other artistic effects. *Aldus Gallery Effects: Classic Art, Volume 2* has 16 new effects, including bas relief, colored pencil, patchwork, rough pastel, rubber stamp, photocopy, and notepaper. You can apply these effects directly from the program, but it also works as a plug-in module within *PhotoStyler*, *Fractal Design Painter*, and any *Windows* image-editing program that uses *PhotoStyler*-compatible plug-in filters. All the effects in the $99 *Classic Art, Volume 2* are customizable. You can alter the settings to get exactly the level of Glowing Edges or Diffuse Glow that you want. You can also apply an effect to an entire image or just a portion, combine effects to create new looks, and preview an effect before applying it to an image. Aldus Corp., 800/888-6293 ext. 2, 619/695-6956.

Reader service no. 710

Q-DOS Collection

Why should you buy four or five separate utilities, each costing $70 to $100, when you could get all of them in one package for $179? The success of utility collections like *PC Tools* and *Norton Desktop* proves that many users have decided they shouldn't. Now Gazelle Systems has bundled its three separately sold utilities, added some extras, and created *Q-DOS Collection*. As the name implies, Gazelle's DOS shell, *Q-DOS*, is *Collection*'s main draw. One of the oldest and most established DOS shells around, the version of *Q-DOS* included in the collection allows you to view files stored in *WordPerfect*, *1-2-3*, *dBASE*, and a few other popular formats. *Q-DOS Collection* also includes Gazelle's *Back-It* for floppy and tape backups and its *OPTune* disk optimizer. The *Collection* versions of both of these products sport improved mouse support. To these established products Gazelle has added a disk cache, and a virus scanner that can find, but not repair, infected files. A multilevel menu system ties all of these programs together. Gazelle Systems, 800/786-3278, 801/377-1288, 801/373-6933 (fax).

Reader service no. 711

SyDOS 88 Extra

Users of SyDOS's 44MB removable cartridges can now move up to a higher-capacity drive without losing their in-

vestment in their 44MB media. The SyDOS 88 Extra, an enhanced version of the 88MB SyDOS 88 removable-cartridge subsystem, both reads and writes to 44MB SyQuest cartridges. (The previous SyDOS 88 drive could not write to 44MB cartridges.) The average seek time of the 88 Extra is 20ms; effective access time is as low as 9ms, according to the company. Users of SyDOS 88MB drives can upgrade to the 88 Extra by calling 800/437-8367. Those with SyDOS 44MB drives can get the 88 Extra from resellers, retailers, or for a limited time directly from SyDOS. The 88 Extra is $999 for the internal model, $1069 for the external. SyDOS, 800/437-9367, 407/997-0924 (fax).

Reader service no. 714

FaceLift 2.0 for WordPerfect

This upgrade to Bitstream's font-scaling utility for *WordPerfect* offers 10 more Bitstream typefaces, bringing the number of typefaces to 26. It offers faster printing—up to 50 percent faster than the previous version, according to Bitstream. Users can now add shadows and fill patterns to typefaces and choose from 40 scalable patterns. There's enhanced network support; *FaceLift* runs under NetWare, NetWare Lite, *LANtastic*, VINES, 3COM, and *LAN Manager*. The new version supports color printers and will run on up to 14 printers on a network—twice the number previously supported. *FaceLift 2.0* costs $99; registered users of versions 1.0 and 1.5 pay $39.99. Included are 20 winter holiday fonts (Halloween, Thanksgiving, Christmas, Hanukkah, Valentine's Day, and a set of snow-capped letters) and a package of specialty paper for laser printers. A set of 20 additional typefaces is available to upgraders for $20. Bitstream, 800/522-3668.

Reader service no. 717

Dynodex for Windows

WINDOWS Previously available only for the Macintosh, the *Dynodex* contact manager now makes its *Windows* debut. *Dynodex* keeps all its data in RAM, so it takes less time to locate phone numbers, names, and addresses. Two other distinguishing features are *Dynodex*'s shorthand keys and automatic capitalization, which conserve keystrokes and reduce entry time. The shorthand keys fill in commonly used words—say, a state name—after you type the first identifying letters. Also, *Dynodex*'s Select function is multilevel, so you search using two words at once—for example, you could search company fields for both *software* and *California*. *Dynodex* prints pages that fit into popular personal organizers, including Day-Timers and Day Runners. It also prints mailing labels, Rolodex cards, and envelopes. *Dynodex* costs $89.95. Portfolio Software, 800/729-3966, 408/252-0420.

Reader service no. 718

ImagePals 1.2

WINDOWS This upgrade of *ImagePals* supports more file formats than before and offers new features such as much improved image editing, which lets you paint, retouch, and merge images, and OLE support, which lets you bring images into *Windows* programs such as *Word* and *Excel*. *ImagePals* allows you to organize graphics files and capture images. It sorts graphics files into

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NO. OF MODULES	9	1	9
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Boise, ID 83707
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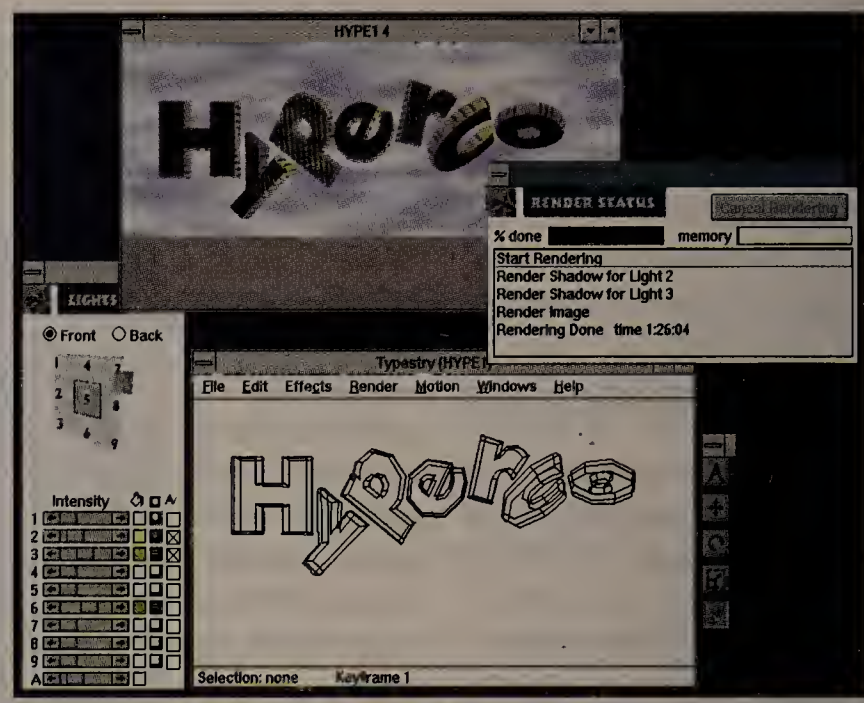

PIXAR TYPESTRY 1.1 is a powerful 3-D type and logo design tool. Text tools let you move, size, skew, and rotate entire objects.

albums—helpful for organizing business projects or presentations. To locate a file, browse through thumbnail images or use the program's search/sort feature. *ImagePals 1.2* supports 15 additional file formats, including CGM, DXF, MAC, PCD, PCT, and WPG. You can import images from scanners, video boards, and photo CDs. For presentations, a new slideshow feature lets you link images with a variety of transition effects. *ImagePals 1.2* costs $249, but registered users can upgrade for $29. U-Lead Systems, 800/858-5323, 310/523-9393, 310/523-9399 (fax).

Reader service no. 704

Pixar Typestry 1.1

WINDOWS For the last word in 3-D type manipulation and logo design, Pixar offers *Typestry 1.1*. Users enter text, select a TrueType or Type 1 typeface, and click to build a rudimentary wireframe version, turning the characters into a three-dimensional object. The product's text tools let you move, size, skew, and rotate either the entire object or individual characters. Once you have the shape, you pick a look—metal, wood, marble, tortoiseshell, and so on—for the text, floor, and wall, and set a degree of opacity. There is a separate menu that lets you choose front and backlights, shadows, and special effects, including zoom or fish-eye lens, motion blur, and animation. A final click renders the image in TIFF, BMP, PS, TGA, or RIB format. Since rendering is a lengthy procedure, *Typestry* offers a low-res Quick 'n' Dirty option, a somewhat slower and more accurate Reasonable rendering, and, for final output, an Excellent 'n' Slow version, which performs exactly as advertised. *Typestry* files export smoothly into *Photoshop*, *PageMaker*, and *QuarkXPress*, making the program ideal for fliers, newsletters, and presentations. For viewing animations, the $299 *Typestry* ships with a runtime player of Autodesk's *Animator*. Pixar, 800/888-9856, 510/236-4000, 510/236-0388 (fax).

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For more information about any product, contact the manufacturer or circle the number on the reader service card.

Marketplace

A Monthly Survey of Prices on Popular Models

Over the Counter

What you pay for popular PCs (without monitors)

n/a = not applicable

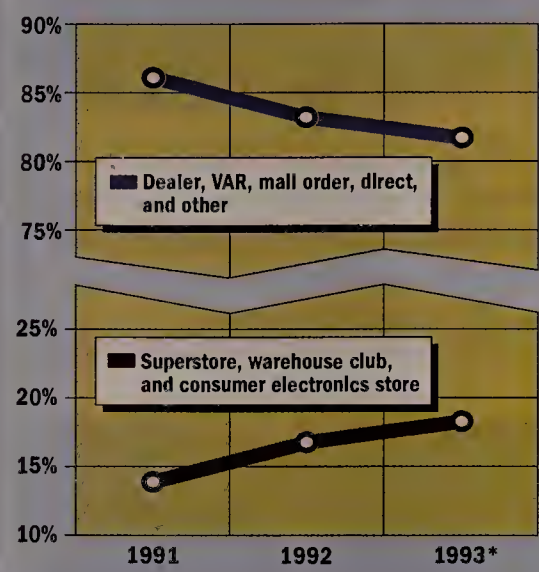
	Configuration			National	
	CPU/speed (MHz)	RAM (MB)	Hard disk (MB)	List	Average street price
386-based desktop PCs					
ALR Flyer SC 3/33s	i386SX-33	2	80	$799	$690
AST Bravo 3/33s	AMD386SX-33	4	120	$1495	$1369
AST Power Premium 3/33[1]	i386DX-33	4	210	$3095	$2668
Compaq Deskpro 3/33i	i386DX-33	4	120	[2]	$1448
DEC DECpc 333sx LP	i386SX-33	4	52	$999	$999
HP Vectra 386s/25	i386SX-25	2	84	$1699	$1400
IBM PS/ValuePoint 325T	IBM386SLC-25	2	80	$889	$889
486SX-based desktop PCs					
AST Bravo 4/33s	i486SX-33	8	213	$1995	$1824
Compaq ProLinea 4/25s	i486SX-25	4	240	[2]	$1168
Epson America Progression 486SX/25	i486SX-25	4	240	$2299	$2000
FastMicro ValueLine 4SX/25	I486SX-25	4	85	$799	$799
Gateway 2000 4SX-33	i486SX-33	4	170	$1325	$1325
IBM PS/2 Model 85 XP 486[3]	i486SX-33	8	212	$4260	$3827
NEC PowerMate 486SX/25i	i486SX-25	4	120	$2049	$1754
Samsung DeskMaster 486C/25	Cx486SLC-25	2	200	$1382	$1382
ZDS Z-Station 433Sh	i486SX-33	4	200	$1820	$1820
486DX-based desktop PCs					
AST Bravo 4/66d	i486DX2-66	8	210	$2895	$2646
Compaq ProLinea 4/33	I486DX-33	4	240	[2]	$1542
DEC DECpc 466d2 LP	I486DX2-66	8	245	$2599	$2599
Dell 466/M	i486DX2-66	8	320	$2950	$2950
Gateway 2000 4DX2-66V	I486DX2-66	8	340	$2425	$2425
Hyundai 466D2	i486DX2-66	8	360	$2745	$2745
IBM PS/2 Model 95 XP[3]	i486DX-50	16	400	$11,995	$10,646
IBM PS/ValuePoint 433DX	i486DX-33	8	120	$1369	$1369
Insight 486DX2-66	I486DX2-66	4	210	$1780	$1780
Zeos 486DX-33	i486DX-33	8	245	$2095	$2095
Portable PCs					
AST PowerExec 3/25SL	i386SL-25	4	60	$2395	$2095
Compaq Contura 3/25	i386SL-25	4	120	[2]	$1591
Dell 320SLi	i386SL-20	2	80	$1849	$1849
Dell Dimension NL25	i386SL-25	2	80	$1599	$1599
Gateway 2000 Nomad 420SXL	I486SX-20	4	80	$1995	$1995
Gateway 2000 Nomad 450DXL	I486DX2-50	8	200	$3295	$3295
HP 95LX	NEC V20-5	1	n/a	$799	$583
Hyundai Courier Spectra	Cx486SLC-25	4	120	$2999	$2999
IBM ThinkPad 700	IBM486SLC-25	4	80	$2750	$2564
NEC UltraLite SL/20	i386SL-20	2	80	$1699	$1453
TI TravelMate 4000WinDX	i486DX-25	4	120	$3299	$3026
Toshiba T3300SL	i386SL-25	2	80	$2299	$2035
Toshiba T4400C	I486SX-25	4	120	$3999	$3550
ZDS Z-Note 325Lc	I386SL-25	4	120	$3277	$3277

From a national survey of more than 180 dealers by International Data Corporation. Figures are based on at least four price quotes for each machine. Prices are based on manufacturer's standard configuration without monitor.

[1]Uses EISA bus. [2]No list price available. [3]Uses MCA bus.

PC Buyers Seek Alternatives

PC unit sales by channel



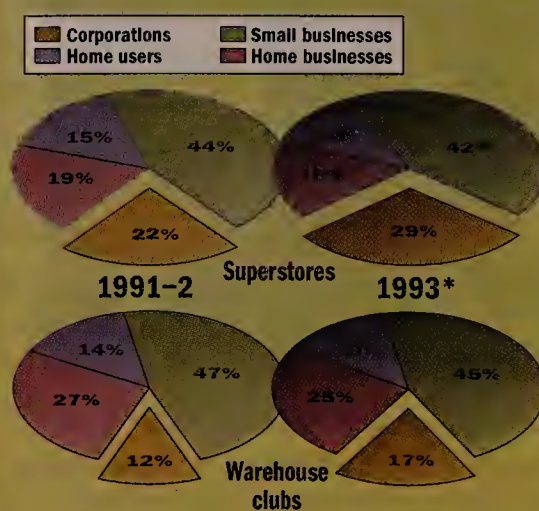
Increasingly, PC buyers are purchasing from alternative sources such as superstores and warehouse clubs. That trend is expected to continue: The number of systems sold through these channels will jump by 4 to 5 percent in 1993, says David Rines, a distribution channels analyst at International Data Corporation, a Massachusetts-based market research company.

*Projected

Source: International Data Corporation

Corporate Buyers Are Fastest-Growing Customer Group

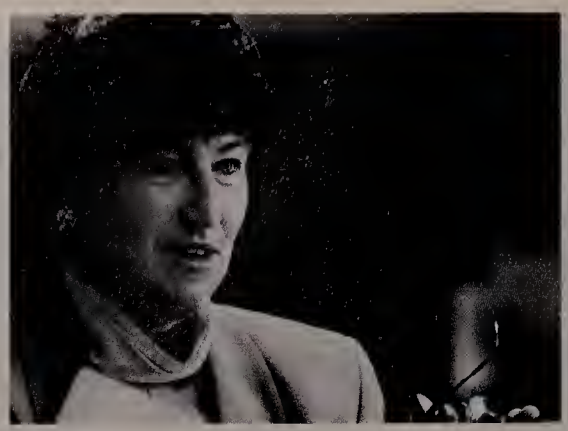
Who's buying at superstores and warehouse clubs



Corporate customers (those from mid- to large-size companies) represent the fastest-growing segment of buyers at superstores and warehouse clubs. Corporate buyers will keep shopping at these outlets in the future because they offer quick access to PCs from favorite vendors at bargain prices, says John Dunkle, president of WorkGroup Technologies, a market research company in New Hampshire.

*Projected

Source: WorkGroup Technologies



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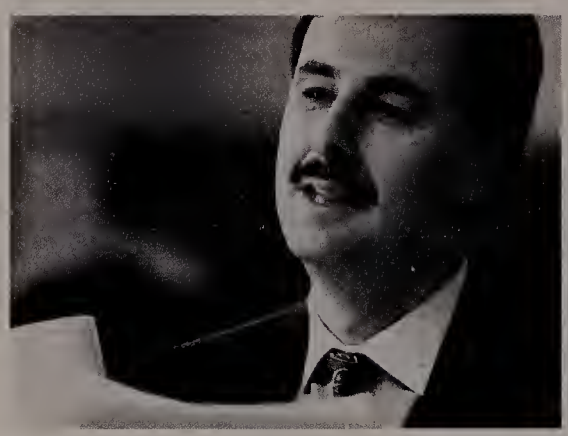
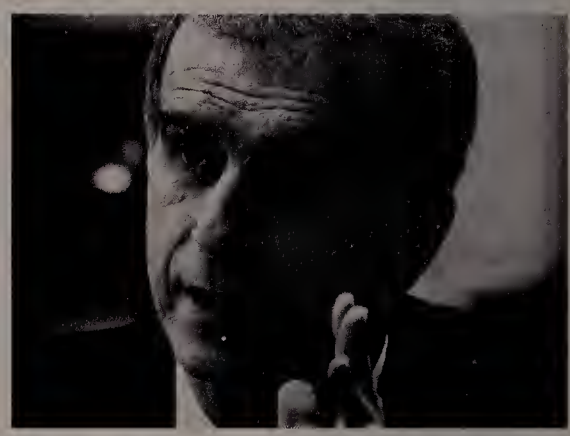


If I can't share information, everybody loses. ***FaxMaster*** *and* ***FaxMaster Server*** *are the only products that let me forward faxes to my workgroup at the push of a button. And in this business, that's the type of difference that keeps me on top.*



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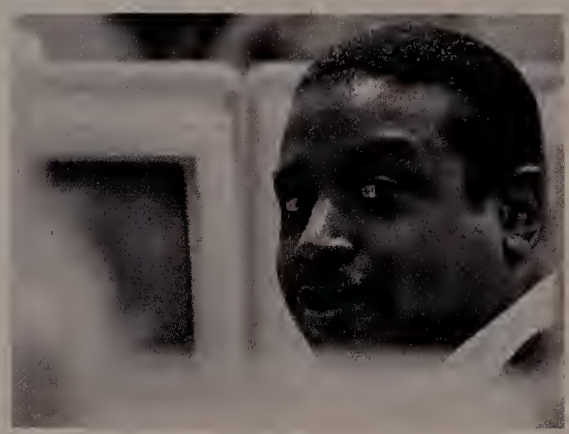

Everyday I deal with reams of information that has to be faxed. ***FaxMaster*** *let's me scan and fax with every one of my company's scanners. So now I never have to waste time at a fax machine.*

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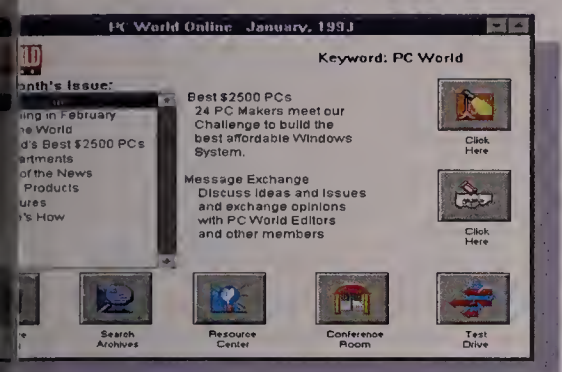

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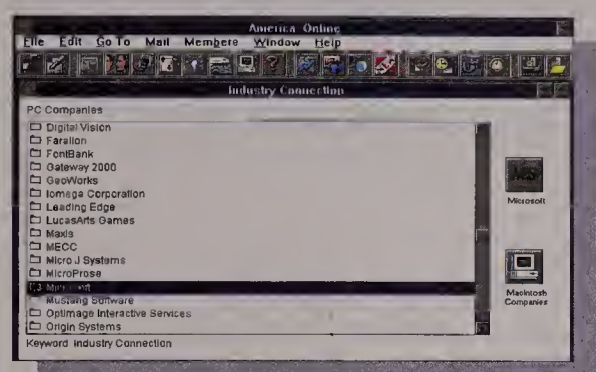
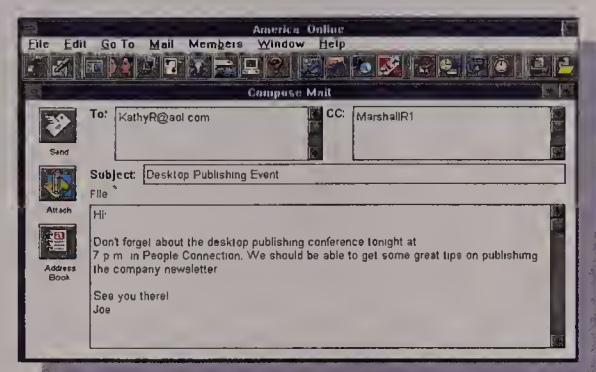
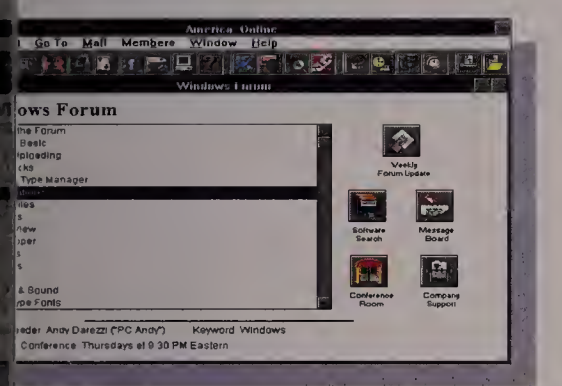


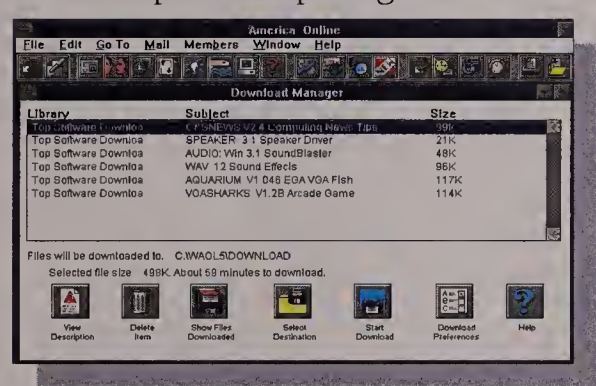
Expert Computing Advice



Internet E-Mail Gateway



Windows Advice & Support



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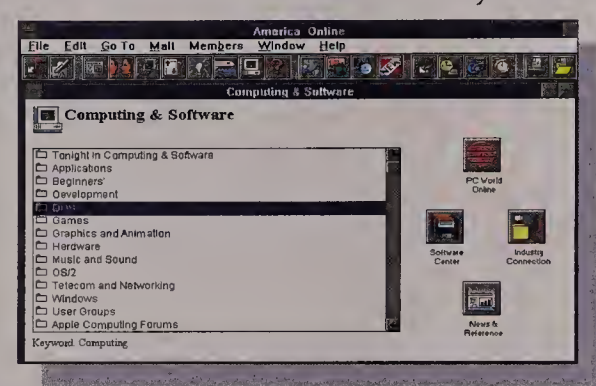

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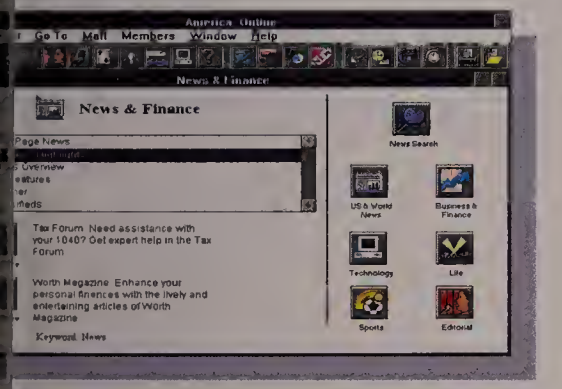

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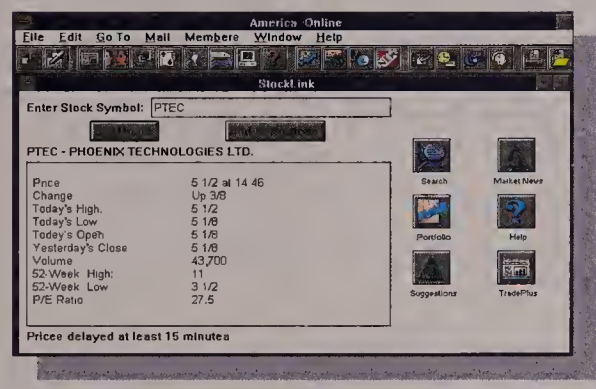

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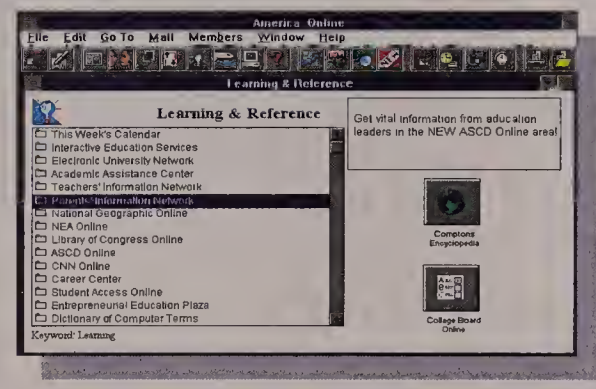

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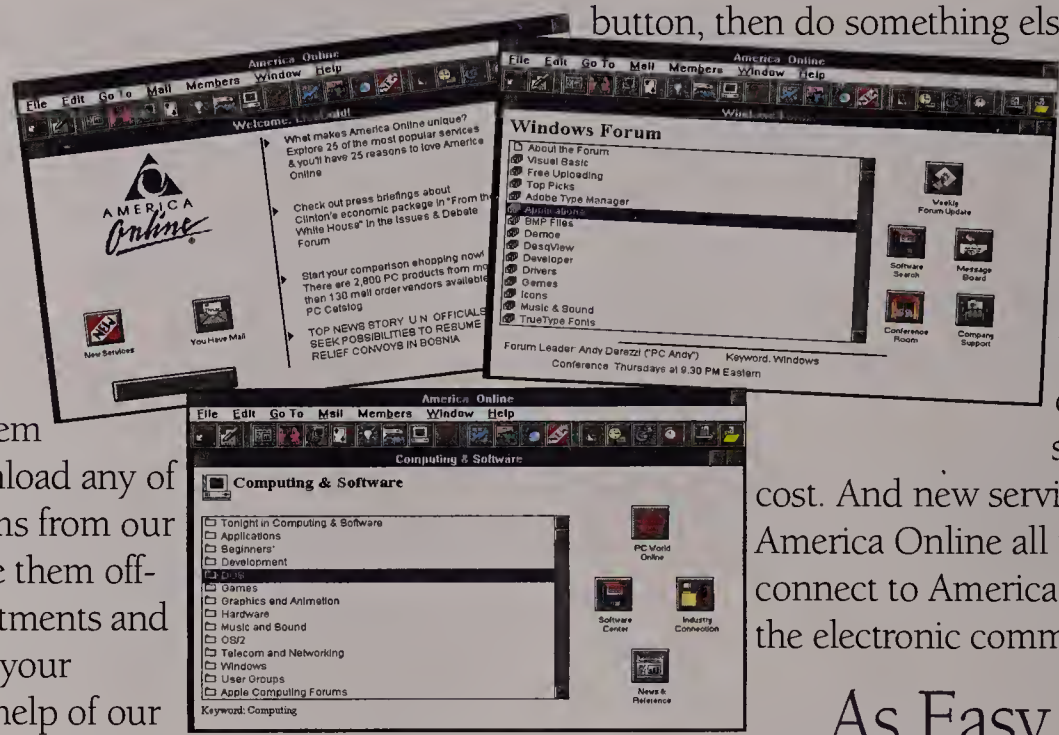

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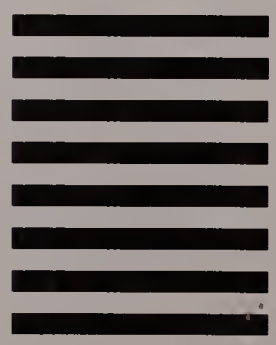

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compression
memory management
DOS 6
backup

The latest DOS is brimming with goodies, from built-in file compression to an antivirus program. While DOS 6 is not revolutionary, you will probably find that you can't live without it.

Here's my humble suggestion for the DOS 6.0 ad campaign: "Attention, Microsoft shoppers. Step right up to purchase your copy of DOS 6.0, the one-stop answer to all your operating system and utility program needs."

Do You Need It?

Sure, it's not exactly Microsoft's style, but neither is this version of DOS. After all, the last new DOS, the exquisite 5.0, featured major revisions to the core of the operating system—changes that made the old versions obsolete.

Version 6.0 is more problematic. It has some highly visible new features, and the appropriate amount of time has passed since the last release. But despite the new and improved features, 6.0 may not create the sort of upgrade frenzy that propelled version 5.0 to the top of the charts for the better part of a year.

This isn't to say that DOS 6.0 doesn't have valuable new capabilities. It does. For the first time, DOS is able to compress files (increasing hard disk capacity), defragment files (to speed things up), and protect the system against viruses. And memory

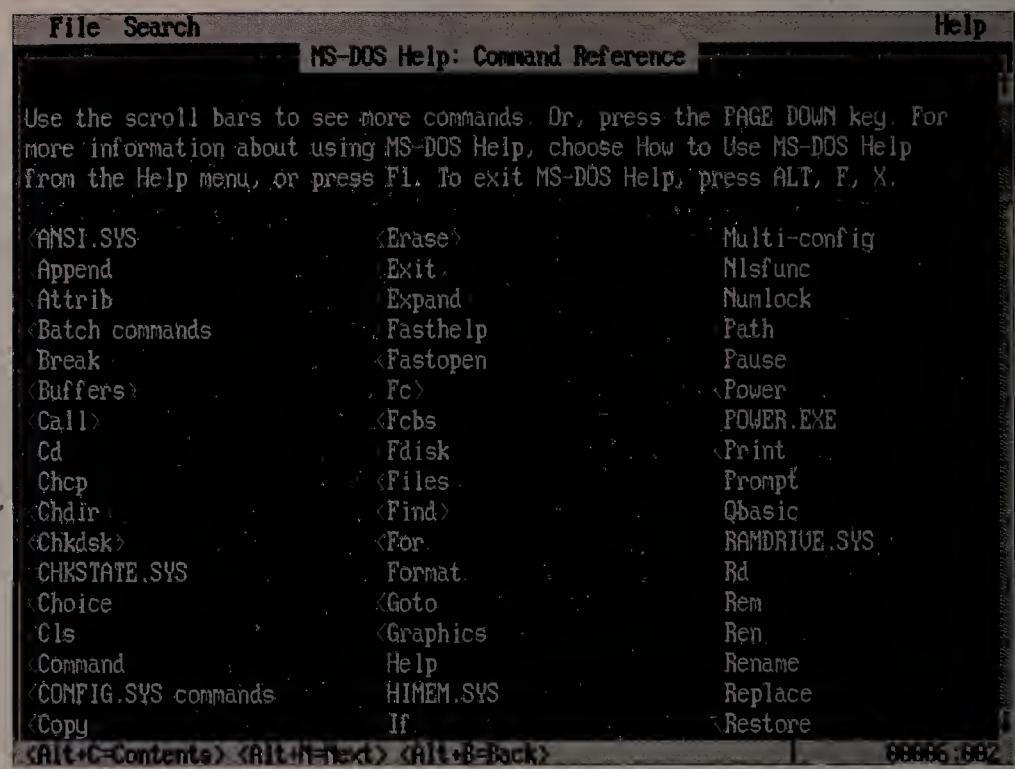
By Van Wolverton

GORDON STUDER

antivirus

management, a welcome but tedious do-it-yourself addition in DOS 5.0, now does its thing without requiring any fine-tuning of CONFIG.SYS.

But compression, defragmentation, and the rest are available elsewhere from dozens of third-party utility vendors (see "The Fate of the Third-Party Utilities"), and many serious users have already souped up their systems with these handy tools. Further diminishing demand, users are basically satisfied with version 5.0 (except for the usual grousing about the inadequacies of DOS itself). Besides, most interesting software developments in the last couple of years have been in *Windows* programs. A lot of systems start up in *Windows* these days; the only time the DOS prompt sees the light of day is in that flash between *Windows'* disappearance and the collapse of the screen when the power is switched off.



EXPANDED ON-LINE HELP GIVES YOU HYPERTEXTLIKE LINKS. Double-click on any entry for a detailed description, including examples and how-to-use advice.

Utilities Lead the What's-New List

The most ballyhooed additions in version 6.0 are four utilities, three of which Microsoft licensed from Symantec and Central Point Software. (This strategy began in DOS 5.0 with Undelete, which was licensed from Central Point.) These programs display their own screens, let you drive using either the keyboard or the mouse, and feature menus, dialog boxes, and other text-based trappings that mimic a graphical user interface. They give DOS capabilities formerly available only from other vendors—the most successful of which, curiously enough, are the very same Symantec and Central Point Software.

Microsoft is particularly proud of DoubleSpace, a utility that integrates file compression into the operating system and more or less doubles the capacity of a hard disk. The amount of compression depends on the size of your hard disk and the kind of files you use, among other factors. When asked to compress a 72MB hard disk that contained nearly 30MB of mostly program files, DoubleSpace managed a ratio of 1.5 to 1, compressing the 30MB to roughly 20MB. With a 32MB hard disk that was almost filled, primarily with *Microsoft Word* and *PageMaker* documents, the compression ratio jumped to 1.9 to 1—about 17MB.

Though DoubleSpace doesn't offer all the features available in

DOS 6's Greatest Hits

Microsoft is touting DoubleSpace—its version of file compression—as DOS 6.0's hottest feature, because everybody wants more disk space. For many users, Microsoft may be right. But if you're already using *Stacker* or some other file compression program and you're happy with it, DoubleSpace might not move you. In fact, if you've grown accustomed to *PC Tools Deluxe, The Norton Utilities*, or some other collection of utility programs, you may not be overwhelmed by *any* of the new add-ons. Depending on what you need or what you've been waiting for, however, you may find other gems lurking in DOS 6.0.

Pick Your Favorites

If you add new programs or peripherals to your system fairly regularly, the selective start-up capabilities might rank near the top of your list. If you're responsible for maintaining the CONFIG.SYS and AUTOEXEC.BAT files on other machines, you'll be downright delighted with these new features.

If you're one of the millions of people with a disability, the AccessDOS package available on the DOS Supplemental Disk might be the most valuable feature an operating system has ever offered you.

If you spend a lot of time at the C: prompt writing batch files and using DOS commands to manage your filing system, you could build a strong case for the new CHOICE, MOVE, and DELTREE commands.

Dedicated *Windows* users might well prize the *Windows* incarnations of the Backup, Undelete, and Anti-Virus utilities above all. These versions have the same capabilities as their DOS counterparts plus the advantage of a consistent (and simpler) user interface.

So here's one user's top ten list. Remember, though, it's subjective, just like pop music or movie charts. Your preferences will vary; use these numbers for reference only.

1. **New commands:** *I'm a keyboard nut*
2. **New on-line help:** *I hate cracking the manual*
3. **Backup for DOS:** *Anything to encourage me to back up my files*
4. **MemMaker:** *It does a better job than I can*
5. **AccessDOS:** *Should have happened sooner*
6. **DoubleSpace:** *Would be higher, but I've got plenty of disk space*
7. **Undelete for Windows:** *Works smoothly*
8. **Backup for Windows:** *It works fine, but I generally use the DOS version*
9. **Anti-Virus for DOS:** *Glad it's here, but aren't viruses overhyped?*
10. **Anti-Virus for Windows:** *See 8 and 9*

file compression utilities such as *Stacker* from Stac Electronics, it does perform as advertised, nearly doubling hard disk capacity without significant loss of performance. Installation is straightforward, although initial compression might take an hour or two for a large (several-hundred-megabyte) hard disk. DoubleSpace installs a 51K TSR program—which can run in upper memory—that intercepts every request to read from or write to a disk. That means once DoubleSpace is installed, most users probably won't have to run it again. Out of sight, out of mind—just the way you want this sort of program to work.

Backing Up's Not Hard to Do

If running DoubleSpace is a one-time affair, Microsoft Backup—a licensed version of *Norton Backup* from Symantec—is more of a weekly or even a daily proposition. Like DoubleSpace, it isn't as feature rich (or as fast) as its commercially available counterparts, but it's simple enough to run. Backing up the files and directories, for instance, requires just a few keystrokes (or mouse clicks).

Microsoft Anti-Virus, licensed from Central Point, scans files for known viruses. It's fast and easy to use, scans network disks as well as local ones, and includes an extensive database of known viruses. Central Point Software plans to sell periodic updates to the database to maintain protection. The program's memory-resident counterpart, VSafe (requiring 44K of RAM), monitors system memory for suspicious activity.

Closing out the new utilities is another Symantec license, Microsoft Defragmenter, which rearranges files so that they're stored contiguously. This eliminates the fragmentation of disk storage into many small areas and can speed up your system.

Two other additions to DOS 6.0—MemMaker and an on-line help facility—act like separate utilities even though they're not. MemMaker automates the memory management capabilities introduced in version 5.0. One frustration with DOS 5.0 was having to make sure CONFIG.SYS contained just the right commands in just the right sequence to make best use of all available memory. It was tough to get it all right. MemMaker takes that tedious task out of your hands.

On-line help has been greatly expanded into a separate facility with its own idiosyncratic interface. Enter HELP, and you'll see a contents screen that lists every command, plus some other topics. Each entry includes a detailed description, complete with examples and hints for use and hypertext-type links to related commands and information. You can start directly with a command's detailed description—which might be several screens long—by entering HELP followed by the command's name at the DOS prompt (the more limited help offered by DOS 5.0 is still available; just type the command name followed by /?).

A Lot of Finallys

Quite a few of DOS 6.0's new features come under the *finally* category. For example, finally we've got some control over the start-up process so we can escape those tiresome edit CONFIG.SYS/restart/edit CONFIG.SYS/restart cycles. Two new start-up options are available: Pressing <F5> or holding down <Shift> at the 'Starting DOS' message tells DOS to start without processing any of the commands in CONFIG.SYS or AUTOEXEC.BAT. Pressing <F8> tells DOS to prompt you for the go-ahead before carrying out single commands in CONFIG.SYS, or AUTOEXEC.BAT in its entirety. These expedients should put an end to your scrambling to find the emergency start-up disk when a change to CONFIG.SYS or AUTOEXEC.BAT keeps DOS from booting.

And finally, DOS lets you define multiple configurations and pick one at start-up. This multiple-configuration feature is particularly handy if you've got too many device drivers and favorite TSRs, plus a network and who knows what else that just won't fit into memory.

And finally, version 6.0 introduces some commands that DOS should have included long ago:

CHOICE, a batch command, waits for a reply and sets errorlevel to match the key pressed, making interactive batch files possible. (Code for short assembly language programs with similar capabilities has been standard fare in magazines and books for years).

MOVE moves a file to a different directory or disk. It, too, has been simulated with batch files for nearly a decade but is welcome nonetheless. Best of all, MOVE adds the long-needed ability to rename a directory.

What's Still Missing?

It seems churlish to complain about what's missing from DOS even as we celebrate long-overdue additions. But as DOS improves, Microsoft must deal with the rising expectations of users who forget how far we've come since version 1.0.

For example, everyone would like to see a more forgiving command interpreter. In this age of fuzzy logic, blindingly fast processors, and virtually unlimited memory, it should be possible for an operating system to figure out that when you type DOR *.BAK you really mean DIR *.BAK.

And how about a file viewer? Even if *Windows* lacks one, the DOS Shell doesn't, so it *can* be done. If Microsoft doesn't have time to write one, why doesn't it follow its own precedent and license *LIST*, a shareware program that probably has millions of users. (It's time that *LIST*'s author, Vern Buerg, made some real money, anyway.)

What about low-speed peer-to-peer networking that uses the standard serial or parallel port? Nothing fancy, just file and printer sharing at the leisurely speeds those ports can handle.

Wanted: Respectable Batch Language

Power users long for a more respectable batch language that offers minimal BASIC-like features, patterned after the macro languages in *Windows* products. At a minimum, we'd like true IF . . . THEN . . . ELSE and CASE statements; the ability to put command strings in the keyboard buffer for DOS or an application program; the ability to edit text files; and a more flexible way to solicit, interpret, and use keyboard input than CHOICE provides.

And this is really ungrateful: Now that DOS includes a set of utility programs, how about integrating them more gracefully into the operating system, at least so they share the same user interface. The utilities licensed from Symantec (Backup and Defragmenter) look and feel different from those licensed from Central Point (Undelete and Anti-Virus). It would be comforting—and simpler—if they all presented the same face to us.

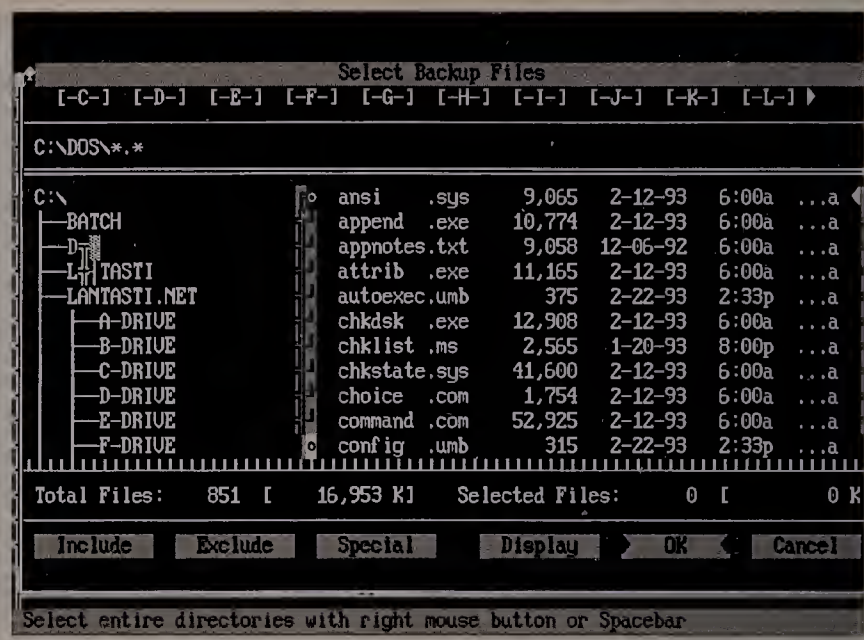
DELTREE deletes a directory and all its files and subdirectories and *their* files and subdirectories and so on. This command speeds file housekeeping chores but is dangerous enough to warrant special care when used.

Now DOS Does Windows

DOS 6.0 acknowledges the existence of *Windows* more directly than any previous release. A DOS 6.0 Setup program option lets you install *Windows*-specific versions of the Undelete, Anti-Virus, and Backup utilities. They offer the same capabilities as their DOS counterparts but are easier to use—the *Windows* interface gives them greater consistency.

There are even a couple of DOS 6.0 features that portable-computer users can call their own. Interlnk is a file transfer utility, something like Traveling Software's *LapLink*, for transferring files from one computer to another, typically from a portable to a desktop. (DOS doesn't include the cable that comes with *LapLink*, so it's not quite as complete a solution.) Power is a device driver that conserves battery power. It's most effective on computers that conform to the Advanced Power Management (APM) specification.

Installation is pretty much unchanged from version 5.0; not quite a no-brainer, it still requires only a relatively painless 10 minutes or so. (Installation also requires a blank disk so that Setup can create an Uninstall disk you can use to restore your previous version of



DOS 6.0'S BACKUP UTILITY may not be as feature laden or speedy as some commercially available utilities, but it's very easy to use.

The Fate of the Third-Party Utilities

A healthy segment of the software industry earns its keep selling utility programs that enhance, expand, and otherwise make up for DOS's shortcomings. Now that Microsoft has expanded DOS to include the more popular utilities, what's to become of utility software companies? Does DOS 6.0 mark the beginning of the end for them, or is it just another challenge to overcome—or even an opportunity to grow? And what can their products offer to users that DOS 6.0 doesn't do as well or better?

Most of the utility companies have reacted similarly to DOS 6.0: They've been on the road since early this year, assuring major distributors and customers that their products still offer a significant advantage over DOS. In many cases they're right, because Microsoft is offering a basic capability, aimed at the lowest common denominator of computer user. Those accustomed to tweaking the last ounce of performance from their system probably won't be satisfied without the most sophisticated utilities.

It's almost as if the utility companies banded together and agreed on a response: "We're not alarmed, we're excited, because Microsoft has legitimized the market for. . . ." Fill in the blank with whatever type of utility that vendor sells. "Microsoft's entry," they continue, "will increase customer awareness of this kind of utility. In fact, we expect our sales to increase significantly, especially when we release our new version of the program shortly after DOS 6.0 is released."

Some of these assessments may be accurate. Utility libraries, for instance, may prove less vulnerable to competition from DOS 6.0 than individual utilities. Symantec (*The Norton Utilities*) and Central Point Software (*PC Tools Deluxe*) both offer extensive collections that not only have more individual utilities but also outperform the utilities DOS 6.0 offers. (After all, these companies licensed the utilities to Microsoft; who better to know a program's limits and shortcomings?)

> How will it all turn out? Are Stac, Symantec, Central Point, and the other utility vendors being realistic, or are they simply whistling past a graveyard, a blip in the path of the Microsoft juggernaut?

Symantec has announced version 7.0 of *The Norton Utilities*, adapted for DOS 6.0. Central Point Software says it plans no specific response to DOS 6.0 but will adapt to any changes the new operating system might require. Neither company expressed great concern about the competition, preferring to view the new DOS utilities as a stimulus to utility program sales.

PC-Kwik Corporation made its reputation selling a disk cache program (*PC-Kwik*, later *Super PC-Kwik*) that revved up hard disk performance. Its current flagship product, *Power Pak*, adds a host of other performance-enhancing utilities, including a disk defragmenter, a screen accelerator, and a keyboard accelerator. Of course, DOS now includes a disk cache (SMARTDRIVE), and the DOS 6.0 utilities compete directly with some of *Power Pak*'s other elements, but PC-Kwik insists that its utilities "are far more fully developed than their DOS 6.0 counterparts." Furthermore, PC-Kwik predicts its technical support will be superior, because when DOS 6.0 comes out with all the new utilities, "Microsoft is going to be buried."

Makers of individual utility programs may have a tougher time competing, especially because users will view DOS 6.0's offerings as free versions of the same thing. But these

DOS, should you want to revert.) Most of DOS 6.0's goodies will be installed whether you want them or not, but you get to decide about three utilities—Backup, Undelete, and Anti-Virus. If you want them, you need to decide whether to install DOS-only, *Windows*-only, or both versions. This isn't a trivial decision; those utilities eat up a lot of disk space (the numbers in the chart at right come from a late prerelease version but should be virtually unchanged in the shipping product).

The other DOS files require 4,200,000 bytes. Installing both *Windows* and DOS versions of these three utilities brings the total to 7MB on your hard disk. (Remember the PC/XT, released at the same time as DOS 2.0? It had a 10MB hard disk.)

DOS 6.0 Utilities: Space Needed

	Windows version only	DOS version only	Both versions
Backup	884,736	901,120	1,785,856
Undelete	278,528	32,768	278,528
Anti-Virus	786,432	360,448	1,032,192
Total storage	1,949,696	1,294,336	3,096,576

Disk space in bytes.

Is This DOS 6.0 or DOS 5.1?

Version 5.0 appealed to us because it was smaller than version 4.0 (in memory, not on disk), faster, and it didn't crash as often. It offered a raft of new features (memory management was the big draw), and it just *felt* right. From the user's standpoint, version 5.0 represented a paradigm shift, a revolutionary change from the dated technology of version 3.3 and the slough of despond called DOS 4.0.

To most users, though, version 6.0 will probably look like an incremental improvement over version 5.0. If any new feature stands out, it's probably the add-on utilities as a group, with DoubleSpace leading the pack (see "DOS 6's Greatest Hits").

Which brings us to the question, Do you need it? The answer depends largely on the sort of applications you use routinely, the

companies, too, are counting on longer lists of features and superior performance to maintain their customer base.

Stac Fights Back

The most widely used file compression program is *Stacker* from Stac Electronics. Because Microsoft is pushing DoubleSpace so hard and because file compression is Stac's only business, Stac has reacted more strongly to DOS 6.0 than the other utility makers. Claiming that Microsoft has violated two patents relating to data compression, Stac is suing for treble damages and has asked the court for an order "permanently enjoining Microsoft" from infringing the Stac patents.

But Stac also has taken pains to emphasize to its customers that *Stacker* is superior to Microsoft's DoubleSpace. *Stacker* can take advantage of the changes made to DOS 6.0 to accommodate DoubleSpace, the company says, and integrate with DOS in a way that makes it even safer and easier to use than before. Stac also claims that *Stacker* compresses data more effectively than DoubleSpace and points out that the hardware version of its product increases performance 100 percent.

Fifth Generation Systems, makers of the best-selling backup program *Fastback Plus*, notes that DOS 6.0's Backup backs up to floppy disks only, ignoring the needs of all those who back up to tape drives, WORM drives, and other high-capacity devices. Fifth Generation, too, is relying on superior features and performance to keep its product moving.

Memory management has been a hot item for several years, with Quarterdeck (*QEMM386*) slugging it out with Qualitas (*386Max*). DOS 5.0 added some rudimentary memory management, but DOS 6.0 makes the feature much more attractive by automating the process. Both *QEMM386* and *386Max* emphasize their ease of use, trying to make the process as painless as possible. I found DOS 6.0's MemMaker to be pretty painless as well, but Qualitas describes Microsoft's memory management as "dated technology" and claims that *386Max* "consistently provides more available conventional memory—40K to over 100K more." Like nearly every vendor I spoke to, Qualitas looks for DOS 6.0 to raise customer awareness, eventually winning a significant number of converts for its product.

CENTRAL POINT LICENSED A VERSION OF ANTI-VIRUS for use in DOS 6.0 but continues to market the program on its own.

How will it all turn out? Are these companies (and others) being realistic? Or are they simply whistling past a graveyard, a blip in the path of the Microsoft juggernaut? Chances are the universe of DOS users is so large that any utility with superior performance and features will find enough believers to survive and even prosper. For users right now, the news is good, as Microsoft pushes the utilities folks to release truly imaginative, useful products . . . or perish.

utilities you already have, the proportion of time you use *Windows*, and how much memory and what size hard disk your system has.

If you're a big-time *Windows* user, you should probably upgrade right away. The *Windows* versions of the utility programs are handy, but even more important, Microsoft continues to improve the coordination between *Windows* and DOS. Recent releases of both *Windows* and DOS have included new versions of the extended-memory manager (HIMEM.SYS), disk cache (SMARTDRV.EXE), and mouse driver (MOUSE.COM). Each of these releases has sped up *Windows*, which needs all the help it can get.

If your system has limited memory and a small hard disk (less than 100MB) and you don't already have a collection of utility programs, you should upgrade just to take advantage of DoubleSpace's file compression and MemMaker's memory management.

If you're a power user, maestro of the command line, composer of masterwork batch files, impresario of an eclectic mix of offbeat devices and obscure programs, you, too, should upgrade right away. The multiconfiguration option alone should be sufficient inducement. Besides, you've got to move to the newest version, if only because so many novices rely on you.

If you're a novice, comfortable with an application program or two but not wise to the ways of DOS and not even sure what a utility program is, you should upgrade. You'll get better memory management than you had with DOS 5.0, the utility programs are easy to use and should prove helpful, and the on-line help just might encourage you to explore the operating system. Plus, your local guru probably has the newest version.

For the rest of you, if you're comfortable with the way things are working now, there's no compelling reason to upgrade. The price is right—the upgrade is $49.95 until May 31. And this version certainly won't be a step back like the DOS 4.*x* upgrade was. But you probably won't miss anything important by sticking with DOS 5.0.

DOS 6.0 ADDS A TOOLS MENU TO FILE MANAGER so you can launch the Windows versions of Backup and Anti-Virus.

Will I upgrade? You bet. My reward for installing six different beta versions and sending in all that paperwork is one free copy of the released version. If I didn't get a free copy, would I upgrade anyway? Yes. My computer is a tool, and DOS 6.0 adds a few tricks to its repertoire. Sometimes evolutionary change is enough.

Van Wolverton is a freelance writer and author of Running MS-DOS, Sixth Edition *(Microsoft Press, Redmond, Washington, 1993).*

WHERE TO BUY

MS-DOS 6.0
Microsoft Corp.
206/882-8080
Pricing: $49.95 until May 31, $129.95 thereafter
Availability: immediate
Reader service no. 727

Software Becomes More Accessible—And Affordable

Buried in the back of the DOS 6.0 manual is a reference to something called AccessDOS, a collection of utilities that makes DOS more accessible to people with disabilities. Among other things, these programs let you:

- **type <Shift>-, <Ctrl>-, and <Alt>-key combinations in sequence, using one finger instead of two or three**
- **adjust the character-repeat rate or turn off character repetition entirely**
- **control the mouse pointer with the keyboard**
- **simulate keyboard input and mouse movements with an alternate input device**

Other utilities ignore accidental keystrokes, display a message that corresponds to sound cues such as warning beeps, and provide alternate keyboard layouts for both hands, left hand only, and right hand only.

You'll find the AccessDOS programs on the MS-DOS Supplemental Disk, which also includes programs and data files from earlier versions of DOS that have been omitted from DOS 6.0. You can order the Supplemental Disk directly from Microsoft using a coupon bound in the back of the MS-DOS 6.0 user guide or by calling Microsoft customer sales and service at 800/426-9400 (voice) or 206/635-4948 (text telephone). The cost is $5 to cover postage and handling.

If you have a modem, you can download the AccessDOS programs from PC World Online's Featured in May folder, CompuServe, GEnie, Microsoft Online, or the Microsoft Download Service (MSDL). To reach MSDL, call 206/936-6735 anytime except between 1 and 2:30 a.m. Pacific time; set your communications parameters to 8-N-1, up to 9600 bps.

Microsoft has also improved accessibility for the visually impaired. You can get the DOS 6.0 manual (as well as documentation for other Microsoft products) on audiotape or floppy disk from Recording for the Blind in Princeton, New Jersey.

If you have the program manual on audiotape, you can use an ordinary cassette player or one that is modified to play back at a faster rate without distorting the sound. If you have the book on floppy disk, there are programs available that use a sophisticated search engine to find topics of interest; these programs can be hooked to other programs that either display the output in very large letters or use a voice synthesizer to read the contents.

Contact: Recording for the Blind, 20 Roszel Rd., Princeton, NJ 08540; 800/221-4792, 609/987-8116 (fax).

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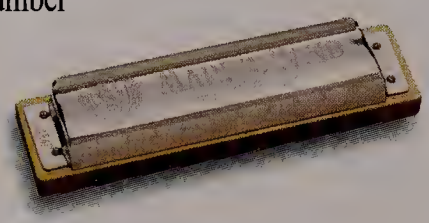

Gimme the Good Stuff –
by Hammer and the Boys

This song is dedicated to everybody who's tired of new technology becoming affordable only after it's upstaged by something better. At Gateway, we offer the latest, newfangled technology at homespun prices.

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Every Gateway 2000 system comes with excellent after-the-sale support. You get a **30-day money-back guarantee**. If you don't like your system, send it back within 30 days for a refund. All systems come with a **one-year limited warranty** and telephone **technical support** for the life of the system from our award-winning tech department. We received *PC World's* World Class Award in 1992 for best service and support in the hardware category. And in a February 1993 survey, *PC Magazine* readers once again gave Gateway an excellent rating for service and reliability. You also get an **automated fax service** to supply you with detailed documentation on over 150 technical subjects, and a **lifetime BBS membership** for additional technical support and online forums.

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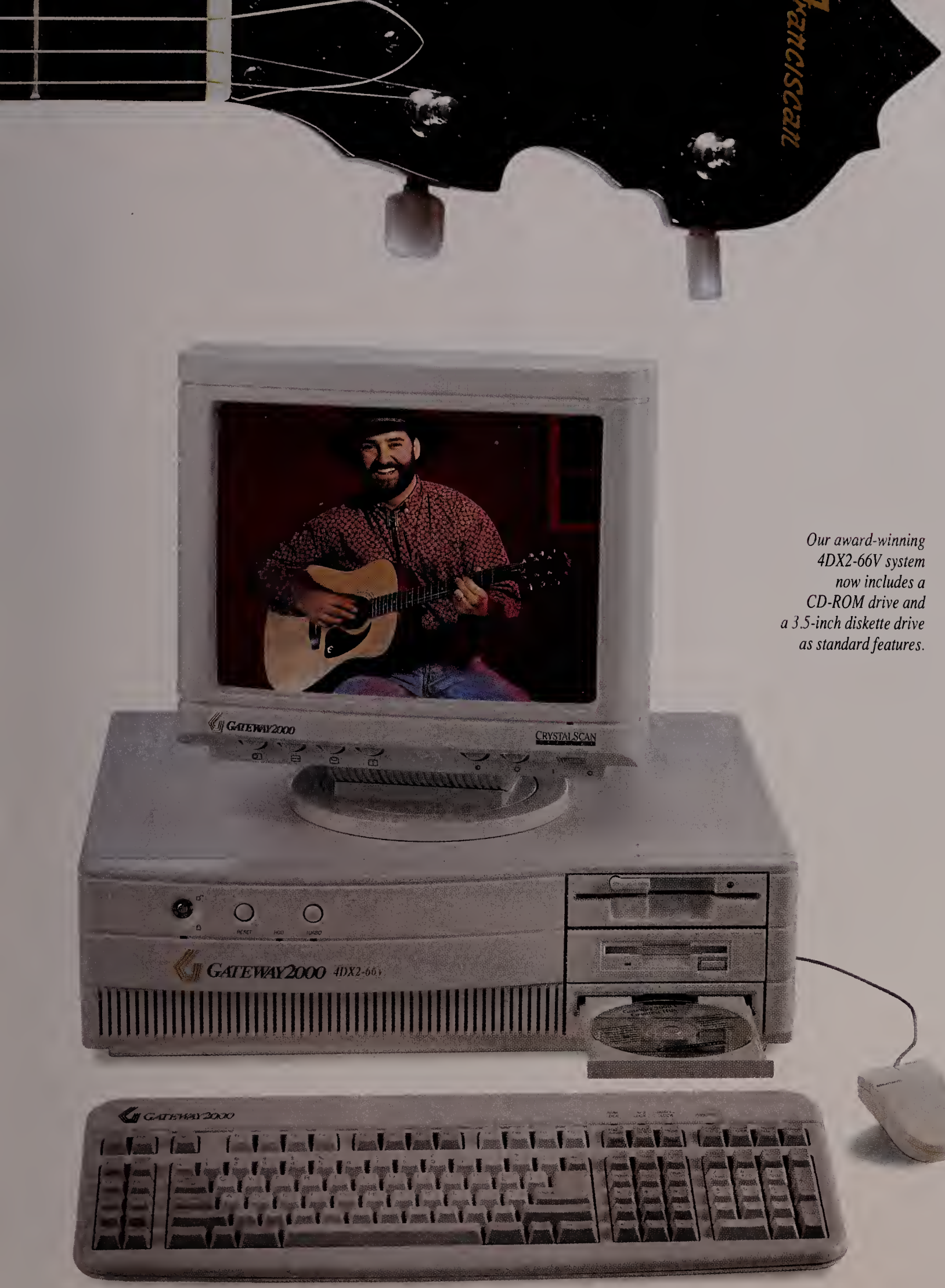
We send our deepest appreciation to each and every Gateway customer. Thank you for believing in us. We've tried hard to always offer you the best value in the personal computer industry. We've succeeded in meeting this goal, although we're the first to admit that demand for the value we offer has sometimes overwhelmed us. We thank you for the understanding and patience you've shown during our growth spurts.

We also want to thank our remarkable vendors – the companies that supply us with the highest-quality, most technically-advanced components, software and peripherals, and those that provide support services. Gateway 2000 has been a most demanding customer, and they deserve a lot of credit for our success.

Now our goal is to make the next million even better, one computer and one customer at a time!



Our award-winning 4DX2-66V system now includes a CD-ROM drive and a 3.5-inch diskette drive as standard features.

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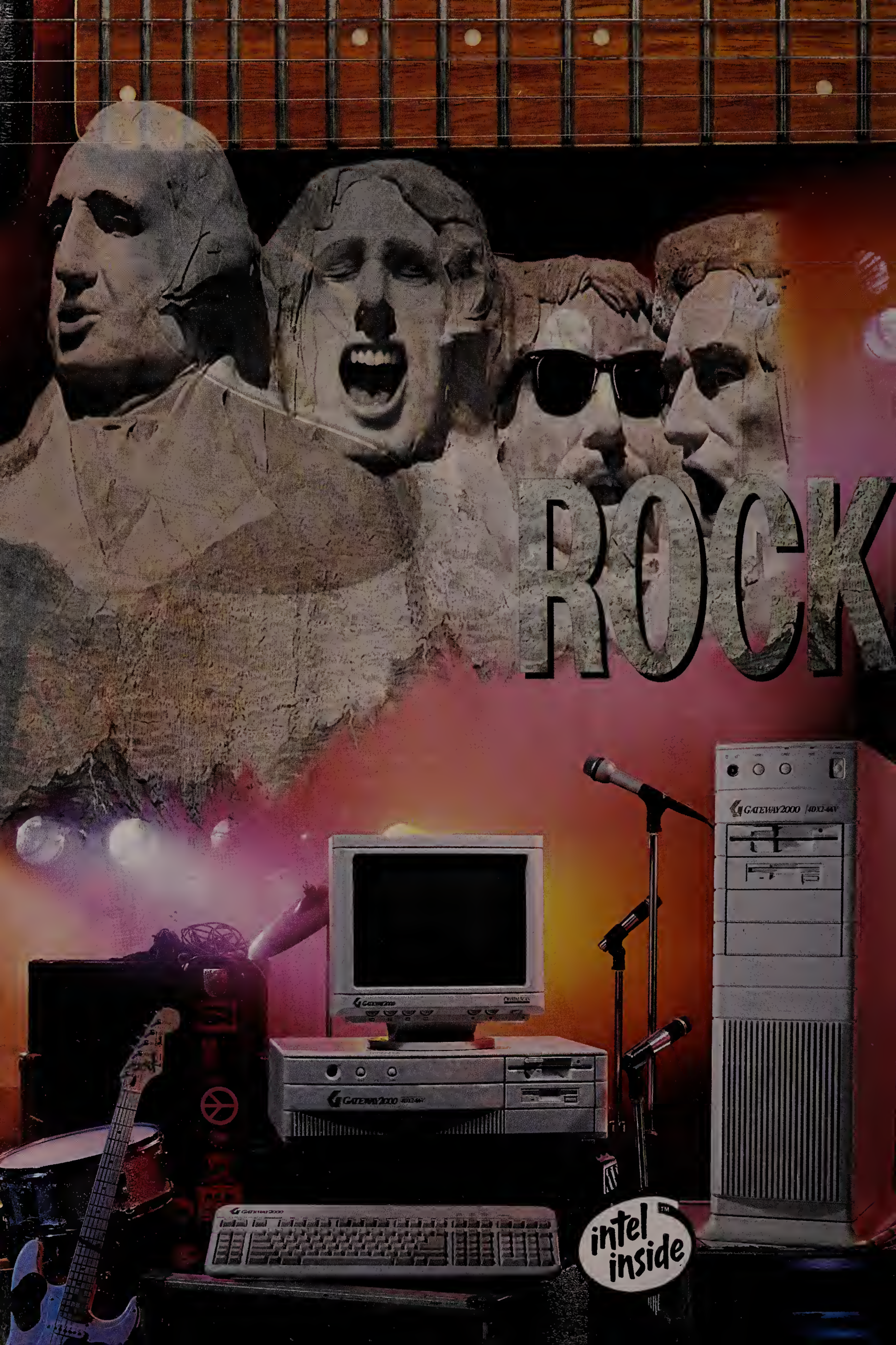
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ccording to PC World, "(Gateway 2000's 4DX2-66V is) v far the fastest machine we've ever tested!"

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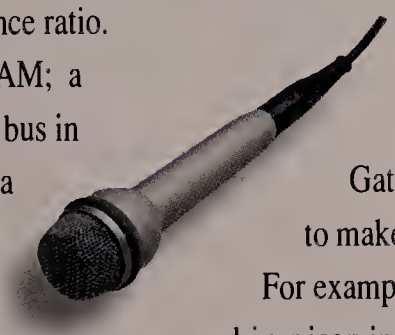

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ateway's 4DX-33V is shown here with Windows und System components, the CD-ROM kit and tional speakers. Call for details on this system.

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DANGER AT YOUR

The routine act of typing can lead to debilitating pain, hours of physical therapy, even surge

Just how great is the

An epidemic is crippling the American worker. It's called repetitive strain injury, and it can attack anyone who spends the day tapping away at a computer keyboard. It's a plague that doesn't discriminate, striking administrative assistants and executives alike. The common denominator is the computer, which by simplifying everyday tasks, has insinuated itself into all aspects of our work lives. We use computers to write to-do lists, prepare reports, communicate with co-workers, and crunch numbers. In short, we can't live without

FINGERTIPS

serious injury to your hands, wrists, and arms? And what can you do about it?

them. But our heavy reliance on personal computers has exacted a price.

Mike Hughes, a 32-year-old Merrill Lynch vice president and frequent business traveler, now has difficulty with such simple tasks as carrying his briefcase or hoisting his luggage into the overhead compartment in an airplane. Joan Lichterman, an editor of 20 years, can't type for ten minutes without intense pain. And as I compose this article, I am forced to dictate my sentences into a tape recorder. I can't touch a keyboard or pick up my kids. Each of us suffers from a repetitive strain injury (RSI) as a result of extended computer use.

"Nerve entrapments, tendon problems, and muscle strain all fall under the RSI rubric," says Dr. David Rempel, director of the Ergonomics Laboratory at the University of California at San Francisco. The symptoms range from persistent aches in the forearms and wrists to pain that extends from the shoulder to the fingertips.

And unlike a head injury or a heart attack, RSI is a cumulative trauma. What begins as a sore arm can, if left untreated, escalate into a full-

By Roberta Furger

blown disability. Days, weeks, months, and years of typing gradually take their toll, until eventually you can't type anymore. Although the pain usually affects the dominant hand first, it's common to wind up with problems in both hands. "There'll be some trouble in the right wrist, so the left hand gets used more, and you wind up with a mirror image set of problems," says Robert Markison, hand surgeon and associate clinical professor of surgery at UCSF.

Epidemic Proportions

The numbers are staggering. The Bureau of Labor Statistics identifies ergonomic disorders as the most rapidly growing category of work-related illness. In 1992 they accounted for 56 pereent of illnesses reported to the Occupational Safety and Health Administration (OSHA). That compares with only 18 percent in 1981 and 28 percent in 1984. (Although there are no precise figures on the rate of injury among office workers, the dramatic rise in cases coincides with the proliferation of computers in today's offices.) The loss to U.S. business is phenomenal. One severe case of carpal tunnel syndrome (CTS), can cost $100,000 in medical and administrative expenses and lost productivity. Blue Cross of California, a heavily computerized insurance firm, spent an average of $20,000 on each of 30 RSI claims in 1990, according to Ellen Ignatius, manager of health and safety. Multiply that figure by the potentially thousands afflicted each year throughout the United States and you have a glimpse of the dimensions of the problem.

I was in great shape. My feeling was, I was not going to get hit with anything like this...it was a rude awakening.

Mike Hughes
Vice President, Merrill Lynch

The Toll

But statistics tell only part of the story. Lives are thrown into turmoil by these injuries. Many people are forced to curtail or stop regular activities as their days become dominated by doctors' appointments and physical therapy sessions. Ultimately many RSI victims are left with no choice but surgery. Among CTS sufferers, for example, surgery has become commonplace. Although the procedure has a success rate of roughly 80 percent, patients generally undergo a lengthy post-operative rehabilitation, and some never regain full strength and use of their injured hand. Lichterman, for example, underwent surgery in both wrists for CTS in 1989 and 1990. After a year of rehab, she went back to work, expecting to resume her normal duties. "But after only half an hour of typing I was in screaming pain," she recalls. Although the surgery prevented further deterioration, Lichterman had already suffered permanent nerve damage before she began receiving effective treatment for her injury. She continues to work full time using DragonDictate, a PC-based voice recognition system from Dragon Systems, which she uses to edit articles, write reports, handle correspondence, and perform every other task she used to handle with a keyboard.

Ironically, especially conscientious and productive workers are often most severely affected: those who work through lunch, volunteer for overtime, and take on extra projects—in short, the ones who do whatever it takes to get the job done.

Take Mike Hughes. Before developing CTS, Hughes thought nothing of working ten straight hours on a critical report and then lifting weights or going bike riding for two hours. "I was in great shape," says Hughes. "I wasn't expecting a wrist injury. My feeling was, I was not going to get hit with anything like this."

But get hit he did. An ill-placed keyboard and long hours of typing without breaks took their toll. "It had been a heavy week of typing," he recalls. "The next day I went out and did a bunch of gardening, then woke up that night with classic symptoms: shooting pain up the arm and numbness in the fingers." Hughes underwent treatments, none of which solved the problem. Finally, he had surgery on his left wrist in February 1992. "It was a rude awakening," says Hughes.

In many respects, Hughes was lucky—a success story of sorts. With the help of an assistant to whom he dictated reports, he never missed a day of work and is gradually regaining full use of his hand.

Seeking the Cause

Why the dramatic rise in injuries? Health and safety professionals, doctors, ergonomists and physical therapists point to a variety of factors. Among the generally accepted culprits are poorly designed workstations with keyboards placed too high, ill-fitting chairs, stressful conditions, and extended hours of typing.

Unlike workers in yesterday's typewriter-equipped offices, today's users work at the keyboard for hours at a time, never varying their activity. "Twenty years ago, people did many tasks; they went to the copy machine, got something out of the filing cabinet, or hit the carriage return," says Rempel. "Now you can do everything from your computer."

But human bodies aren't meant to remain in a sedentary position, nor is the hand designed to be suspended over a keyboard all day, says Markison. He believes that extended use of "inappropriately designed keyboards has accelerated the aging process." The hands' natural, comfortable position, according to Markison, is "handshake position, palms facing each other."

"What would happen if I took you out of this position where you're happy," he asks, "and told you to twist your forearm in a palm-down position and crook your wrist over to the little finger side? In effect, I'm asking you to stretch your muscles and tendons and stay like that, sometimes for hours at a time. Why in the world

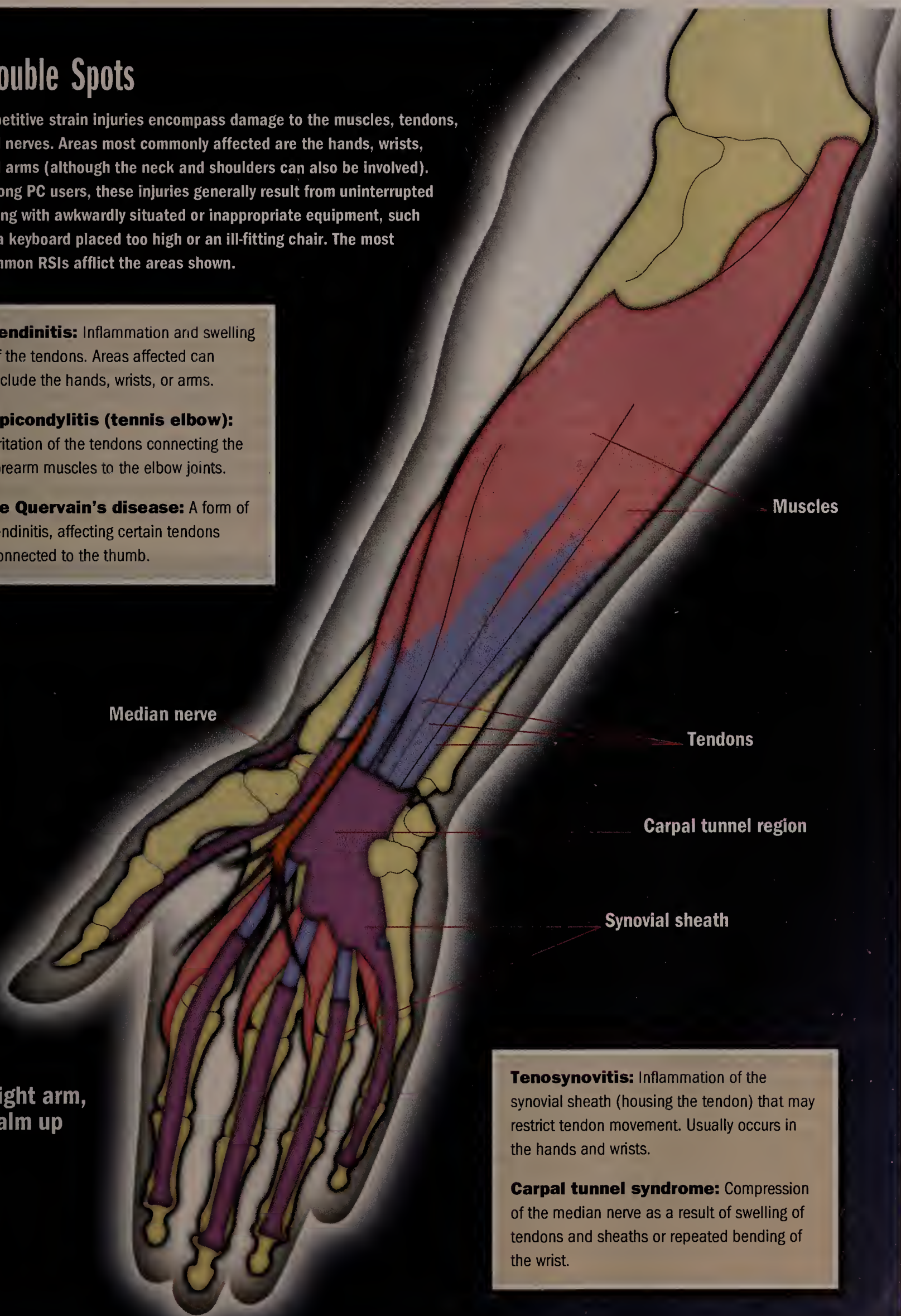
Trouble Spots

Repetitive strain injuries encompass damage to the muscles, tendons, and nerves. Areas most commonly affected are the hands, wrists, and arms (although the neck and shoulders can also be involved). Among PC users, these injuries generally result from uninterrupted typing with awkwardly situated or inappropriate equipment, such as a keyboard placed too high or an ill-fitting chair. The most common RSIs afflict the areas shown.

Tendinitis: Inflammation and swelling of the tendons. Areas affected can include the hands, wrists, or arms.

Epicondylitis (tennis elbow): Irritation of the tendons connecting the forearm muscles to the elbow joints.

de Quervain's disease: A form of tendinitis, affecting certain tendons connected to the thumb.



Tenosynovitis: Inflammation of the synovial sheath (housing the tendon) that may restrict tendon movement. Usually occurs in the hands and wrists.

Carpal tunnel syndrome: Compression of the median nerve as a result of swelling of tendons and sheaths or repeated bending of the wrist.

would anyone design an interface like the computer keyboard?"

That's the most controversial question surrounding RSI. Is the keyboard design to blame for this spate of injuries?

Legal Remedies

Many sufferers believe it is and have sought to prove their contention in court. Hundreds of lawsuits are pending, alleging that keyboard manufacturers, computer companies, and systems integrators sold inherently defective equipment. Among the defendants are PC giants IBM and Compaq, both of which refuse to comment on the litigation or the claims that keyboards have caused injuries.

While named parties are hesitant to comment, lawyers for the companies will likely share a common defense: The keyboards themselves are not the cause of the injuries. Rather, it's how they are being used that causes undue strain.

Because such groundbreaking lawsuits require a staggering amount of research, Judge Jack Weinstein of the U.S. District Court for the Eastern District of New York has consolidated the cases, allowing plaintiffs' attorneys to share critical findings in the initial stages of the case. Defense attorneys are fighting the consolidation, however, and an appeal is pending.

Many observers predict a flood of RSI lawsuits over the coming months. "The number of plaintiffs will very likely go into the thousands by the end of the year," says Neal Taslitz, president and founder of The BackCare Corp., a Chicago-based company specializing in ergonomic products and consulting services. An attorney by trade who closely follows the debate surrounding computer-related injuries, Taslitz argues that by ignoring the problem, the computer industry is partly to blame for the spate of lawsuits: "There's a real tendency by people in the industry just to say, 'Let's not pay any attention to the problem.' "

Industry representatives are quick to contest these charges, however. "We're actively looking at alternative keyboard designs," says Compaq public relations representative Hedy Baker. "But since the cause of the injuries is unclear, we don't know if any of these new designs will provide a solution."

Compaq and other computer companies, including Apple and IBM, have begun funding research into the causes of RSI.

Many in the legal community compare the current activity surrounding RSI injuries and the claims against manufacturers to the product-liability lawsuits waged against asbestos manufacturers.

"The biggest contrast between this and asbestos is that a lot of asbestos clients were catastrophically damaged," says Frank Fernandez, an attorney with the Oakland, California, law firm Kazan,

Snake Oil or Savior?

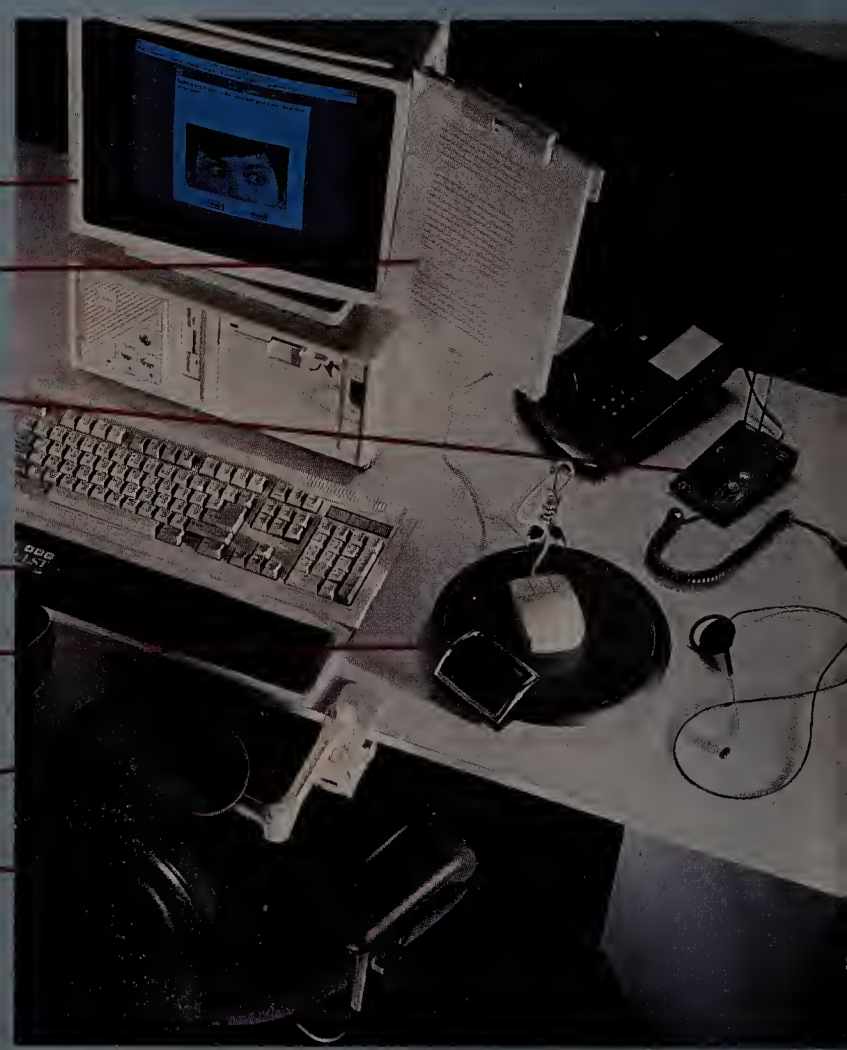
Since the days when they roamed the countryside in wagons hawking snake oil to gullible rubes, peddlers have preyed on the pain and fear of the sick. Today, in response to the RSI epidemic, dozens of companies have entered the booming market for ergonomic computer accessories.

Can these products prevent or alleviate the damage caused by long hours at the keyboard? Or are they Rube Goldberg devices, complex machinery of little usefulness? We asked experts who treat repetitive strain injuries. According to David C. Ciccone, president of Advance Computer Ergonomics, a computer safety consulting firm in San Diego, California, no product should be considered the be-all and end-all. "You have to take a systems approach to preventing repetitive strain injuries," says Ciccone. "That means looking at the whole body, the whole workstation, and the way people work."

Concerned PC users can buy a wide variety of products, from wrist rests to keep their hands positioned correctly while typing to keyboards with hand-friendly layouts, from braces that suspend your arms over the keyboard and mouse to software that prompts you to take a break from typing.

More important than any single product, say the experts, is having a completely adjustable workstation. That includes a desktop that can be raised or lowered as necessary and a fully adjustable chair. The workstation should adapt to the needs and size of the worker, rather than the worker having to adjust to the workstation, says David Rempel, director of the Ergonomics Laboratory at the

Ergonomic Choices



Display of products does not represent an endorsement from *PC World*.

McClain, Edises and Simon, which is currently handling ten RSI cases. "People aren't going to die from RSI, but it will change their lives. They may have to give up careers they trained and went to school for."

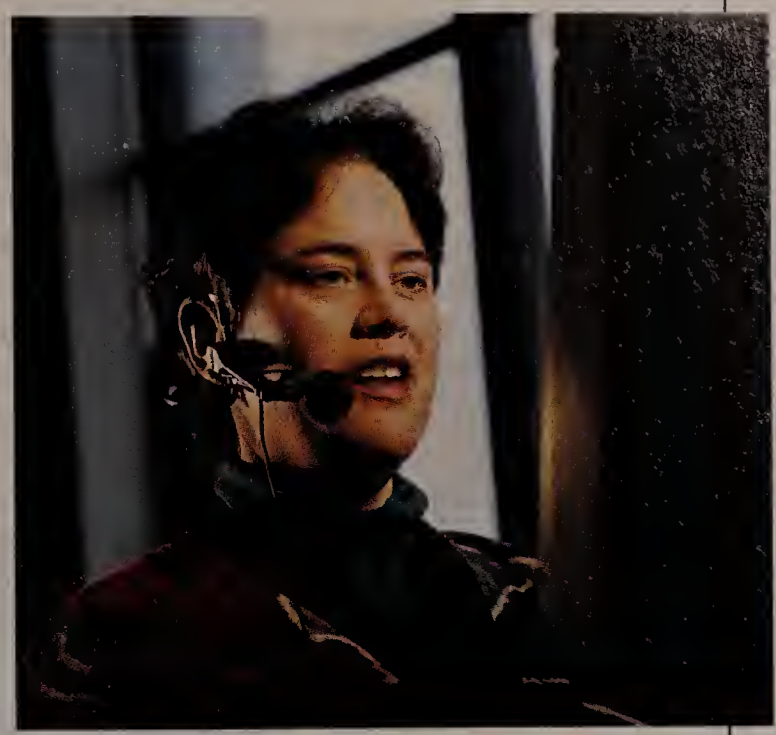
Seeking Support

Many RSI patients are also seeking remedies outside the courtroom. A handful of small, yet vocal support groups have sprung up on the West Coast. Besides giving members an opportunity to share common experiences, the groups provide members with information on their rights as injured workers, investigate causes of RSIs, learn about new treatments, and prompt employers and government to address the epidemic.

"I wanted more information about the injury and I needed to talk to other people besides my doctor," says Caroline Rose, a technical editor with a major computer company and founder of Northern California's first RSI support group, located in the San Francisco Bay Area. She edits a newsletter that includes personal stories and product information. The newsletter is available on several on-line services. (For more information, see the Consumer Watch folder of PC World Online.)

After only half an hour of typing, I was in screaming pain.

Joan Lichterman
Editor



Employers Respond

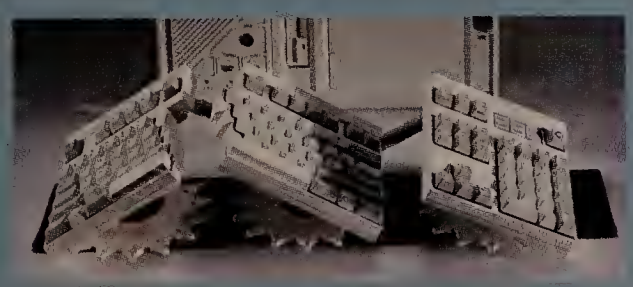
Some employers are getting the message about RSI and are taking a forward-looking approach to preventing and treating such injuries among their workers. Blue Cross of California, for example, has

University of California, San Francisco.

In many of today's offices, wrist rests—flat or curved strips of foam that lay in front of the keyboard—are standard equipment. They're cheap, come in a variety of shapes and sizes, and some even include programmable alarms to alert users that they've been typing too long and need to take a break. But the effectiveness of these products depends on your work habits and work style, says Lisa Voge, an occupational therapist in Palo Alto, California.

"If you drop your wrist down while keying, a wrist rest can help keep your wrist in a neutral position and provide protection against hard edges," she notes. But a wrist rest is designed to support your wrist when you pause in typing, says Voge. If the keyboard is too high, a wrist rest can do more harm than good—users will often lean their wrists on the rest, rather than allowing them to glide above the keyboard as they should. This strains your entire hand while putting weight on the underside of your wrist—the carpal tunnel area.

Ergonomically correct products aren't limited to accessories, though. Over the next few months users will begin to see a host of adjustable alternative keyboards that challenge the standard flat QWERTY design. Some of them split the keyboard in half and allow you to tilt the halves so you are no longer typing on a flat surface. And at least one—the Kinesis—splits the keyboard and recesses the keys in two concave dishes designed to ease stress on the hand. (See Top of the News.) "The standard keyboard puts the hand in an awkward, rotated, and deviated position," says Voge, who believes the adjustable designs of many of the new keyboards is critical. Voge and others, though, note that additional testing needs to be done to determine the alternative keyboards' true value.



SPLIT KEYBOARD relieves strain while typing.

Mice, too, are implicated in the RSI epidemic. Advance Computer Ergonomics' Ciccone expects "the mouse is going to be the next RSI villain. Anytime you lift your arm and hold it above something repeatedly, you put a lot of stress on the upper shoulder." For people who use a mouse and a keyboard, Ciccone thinks that "arm rests that mimic the motion of your arm can be very helpful as long as they are positioned so they allow the hand to dangle. It is a good idea to rest your arm on something while mousing."

Everyone we spoke with agreed that taking charge—not only of your workstation setup, but of the way you work—is essential to preventing and treating injury. Taking breaks, stretching, and even warming up the typing muscles are as important as ergonomic furniture. For those who find themselves forgetting to take regular breaks, there are a number of devices and software programs that will remind you to do so. "If you can't listen to your body telling you when you are in pain and if you don't have automatic interruptions in your work—like phone calls—then devices that signal break time are effective...as long as you listen to them," says Voge.

But as with ergonomic accessories, don't expect break software to solve all your problems, says Ciccone. "Changing people's habits is what's needed. A program won't necessarily do that."

—Christina Wood

developed a comprehensive strategy to combat the problem, starting with an intensive training and education program for all managers and employees.

In an eight-hour training program, managers learned how to recognize symptoms and were instructed to encourage injured employees to come forward immediately. Employees, for their part, received one-hour classes on the dangers of RSI. They, too, were taught how to recognize warning signs and were given thorough instructions on how to set up their workstations. Ignatius and others on the Blue Cross staff also evaluated dozens of "ergonomic chairs" and identified one that was fully adjustable to fit every employee. In the end, 3500 employees underwent the training and received new equipment as part of the company's effort to combat RSI.

Although the program cost Blue Cross hundreds of thousands of dollars, the training and equipment more than paid for themselves. After only one year, the company's insurance carrier gave Blue Cross a $1 million dividend because of reduced Workers' Compensation expenses. Interestingly, more claims were filed after the program was in place, but the average cost per claim fell from $20,000 to $3,000 because problems were identified before they became critical.

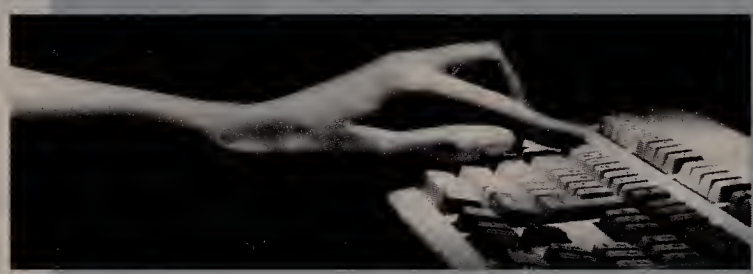
Despite this and other success stories, some companies have hesitated to take such an up-front approach, fearing a Pandora's box of claims. But, says Ignatius, "that's a cheater's way of looking at safety. Employees are adults: If you give them the information they need, they will process it in an adult fashion." She adds that by removing many of the barriers to reporting and acting on claims, the company was also able to drastically reduce litigation costs relating to Workers' Compensation injuries. "Most people litigate because they're afraid or because they don't see any other recourse."

Government Action

If financial or altruistic factors don't spur companies to act, there's a good chance the government may. Many state and local lawmakers are considering legislation governing computer-worker safety. Two of the first such laws were enacted by the city and county of San Francisco and the county of Suffolk in New York state. Both ordinances included guidelines for workstation design, employee training, and appropriate break periods. However, both were also challenged and ultimately overturned in court, on the grounds that states rather than local governments had jurisdiction over such issues. Appeals are pending in both cases.

On the federal level, Senate and House of Representatives committees have held hearings on work-related RSIs, but no legislation has yet been proposed. OSHA is researching proposed work place ergonomic standards to prevent repetitive strain injuries. Among issues being studied is a standard governing computer keyboards. OSHA is reviewing comments submitted by interested parties and will likely hold hearings throughout the United States on its findings. An OSHA spokesperson could not comment on when or if any formal standards would be issued, however.

Awareness Is Key to Preventing RSI Injuries



The healthiest computer users take preventive steps, rather than responding after they suffer an injury. Here's what PC users and their employers alike can do to stay healthy and productive.

USERS

Evaluate your workstation

- **Is your chair fully adjustable?**
- **Do the arm rests hamper your typing?**
- **Can you adjust the height/position of your keyboard?**
- **Is the top of your monitor at eye level?**
- **Do you use a headset while speaking on the phone?**

Take regular breaks from the keyboard

- **Don't type for more than 30 minutes without taking a break.**
- **Alternate tasks throughout the work day.**
- **Use a headset so you can get up and walk around while talking on the phone.**

Protect Yourself Against Injury

- **Limber up before a long typing session.**
- **Wear lightweight, fingerless gloves if your hands are frequently cold.**
- **See a physician at the first sign of pain.**

MANAGERS

- **Organize jobs around a variety of tasks.**
- **Evaluate employee workstations for adjustability.**
- **Organize educational courses that promote awareness of keyboard-related injuries and emphasize preventive measures.**
- **Encourage employees to report problems.**

What's Next?

Disagreements remain over how manufacturers, employers, workers, and government should respond. Some have adopted a skeptical attitude toward the entire epidemic, choosing to believe that RSI claims are a fad—all they have to do is wait a few years and the problem will go away. Others are pushing for more research into the causes of these injuries. In the meantime, thousands of computer users join the roster of RSI sufferers each year, and only a concerted effort on the part of all affected will stem the tide of injuries.

"If it can happen to me," says Merrill Lynch's Hughes, "it can happen to you."

Roberta Furger is a PC World *Associate Editor. She can be reached as R. FURGER on PC World Online (see page 10 for more information). Senior Editor Steve Fox, Associate Editor Bronwyn Fryer, and Assistant Editor Christina Wood assisted with this article.*

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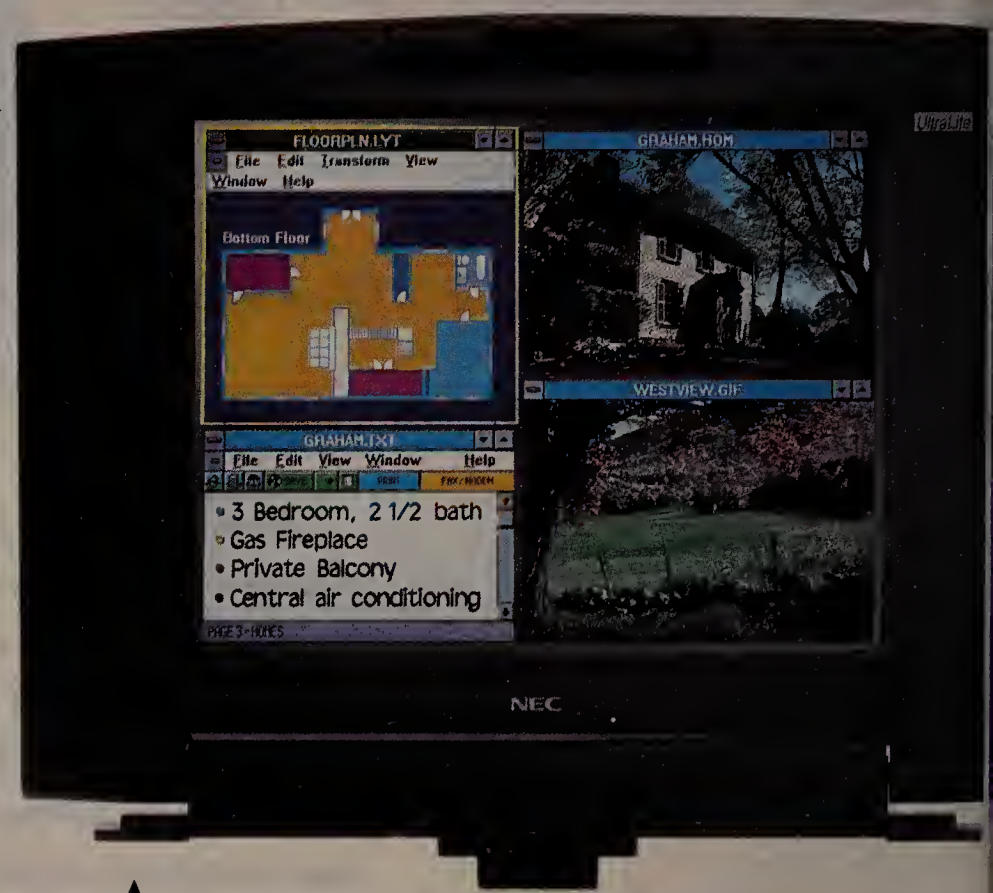
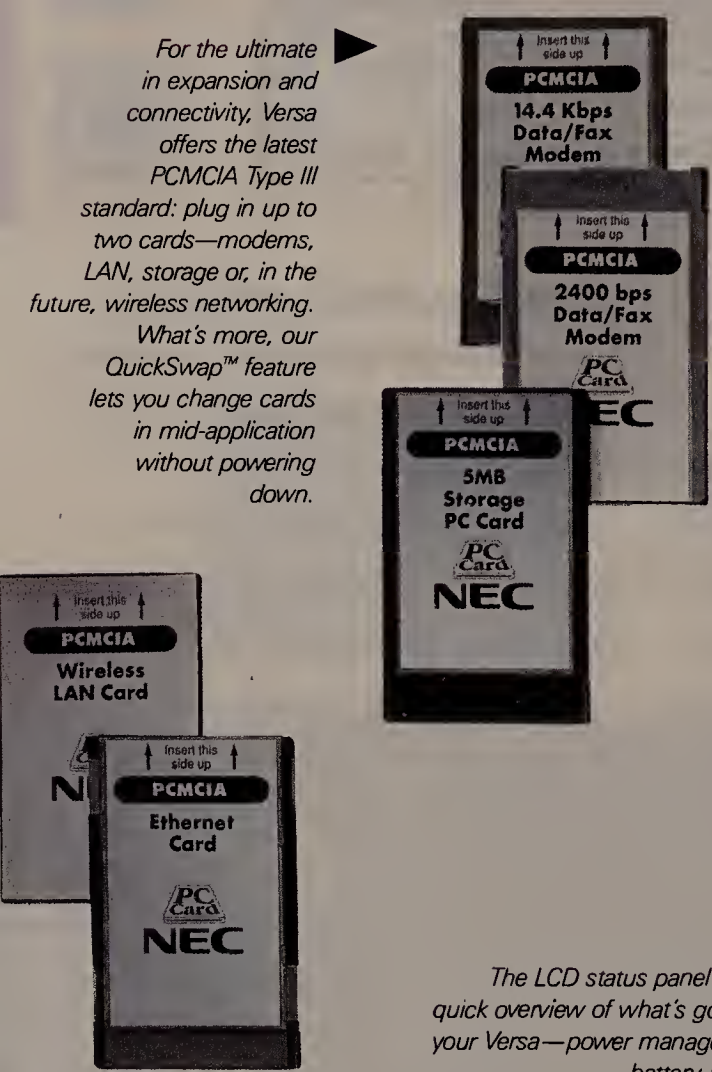
Versa's screen detaches easily, so you can quickly upgrade it, reverse the display or convert to pen.



For the ultimate in expansion and connectivity, Versa offers the latest PCMCIA Type III standard: plug in up to two cards—modems, LAN, storage or, in the future, wireless networking. What's more, our QuickSwap™ feature lets you change cards in mid-application without powering down.



Choose Versa with 256 brilliant colors and the latest active-matrix screen technology, or with 64 crisp shades of gray. Either way, Versa is the first notebook to use local bus video architecture, for dramatically faster graphics performance.

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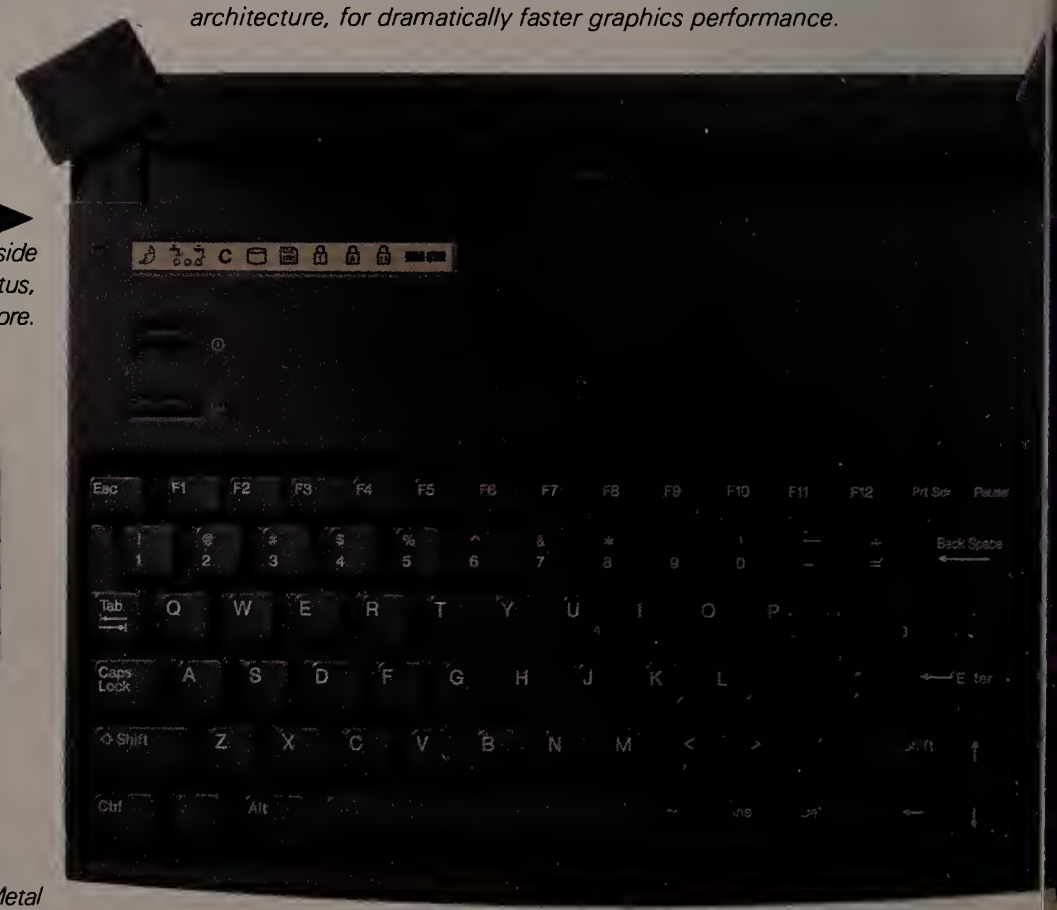

Versa comes standard with a Nickel Metal Hydride (NiMH) battery, for longer life and quick recharging.

intel inside

*3-year limited warranty is standard, UltraCare enhanced warranty program is included in first year upon completion of UltraLite Versa registration card. For more details, call 1-800-NEC-INFO. **Monochrome, 6.6 lbs color †Pen models/upgrades available 3rd quarter 1993. RAM expandable to 12MB today; 20MB avail. 3rd qtr. '93. 33MHz avail. 2nd qtr. '93.
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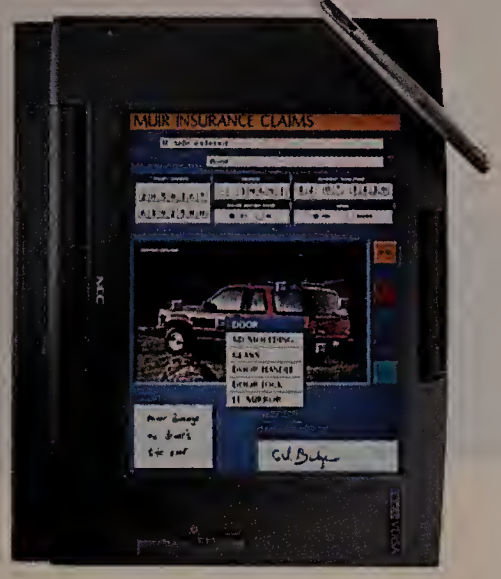
our new UltraLite® Versa™?

▲ *Versa's RAM can be easily upgraded from 4MB to as much as 20MB† simply by sliding in a memory card.*

As with our award-winning monitors, printers, desktop PCs and CD-ROM readers, the new UltraLite Versa is a prime example of what NEC does best: integrating many new technologies into one seamless, highly functional package.

▲ *Versa offers powerful, energy-efficient 3.3V i486SL™ processing. Start with your choice of 20, 25 or 33MHz† processor; upgrade as your computing needs increase.*



◀ *Versa offers innovative active-matrix color pen computing, as well as a monochrome pen model. Versa also converts to a tablet in seconds, for capturing signatures, taking notes or annotating presentations.*

◀ *To increase Versa's storage capacity, just choose from 80MB, 120MB or 180MB removable hard drives. And Versa comes preloaded with Windows™ 3.1 and DOS® 5.0.*

▲ *With our new DoubleTime™ technology, Versa's battery life can be doubled, instantly, by exchanging the floppy drive for a second battery. Result: an astounding* 8-12 hours *for monochrome,* 5-10 hours *for color, depending on usage.*

The new UltraLite Versa is perhaps the one notebook computer you should want right now.

That's because Versa's exceptional upgradability and flexibility give you the power to choose the system you need today, and then enhance its features as your needs change.

Making it a notebook you'll *still* want years from now.

With Versa, you're protected from wasting money on a notebook you might soon outgrow. Protected, too, by a 3-year limited warranty and UltraCare℠ enhanced service plan.*

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NEC

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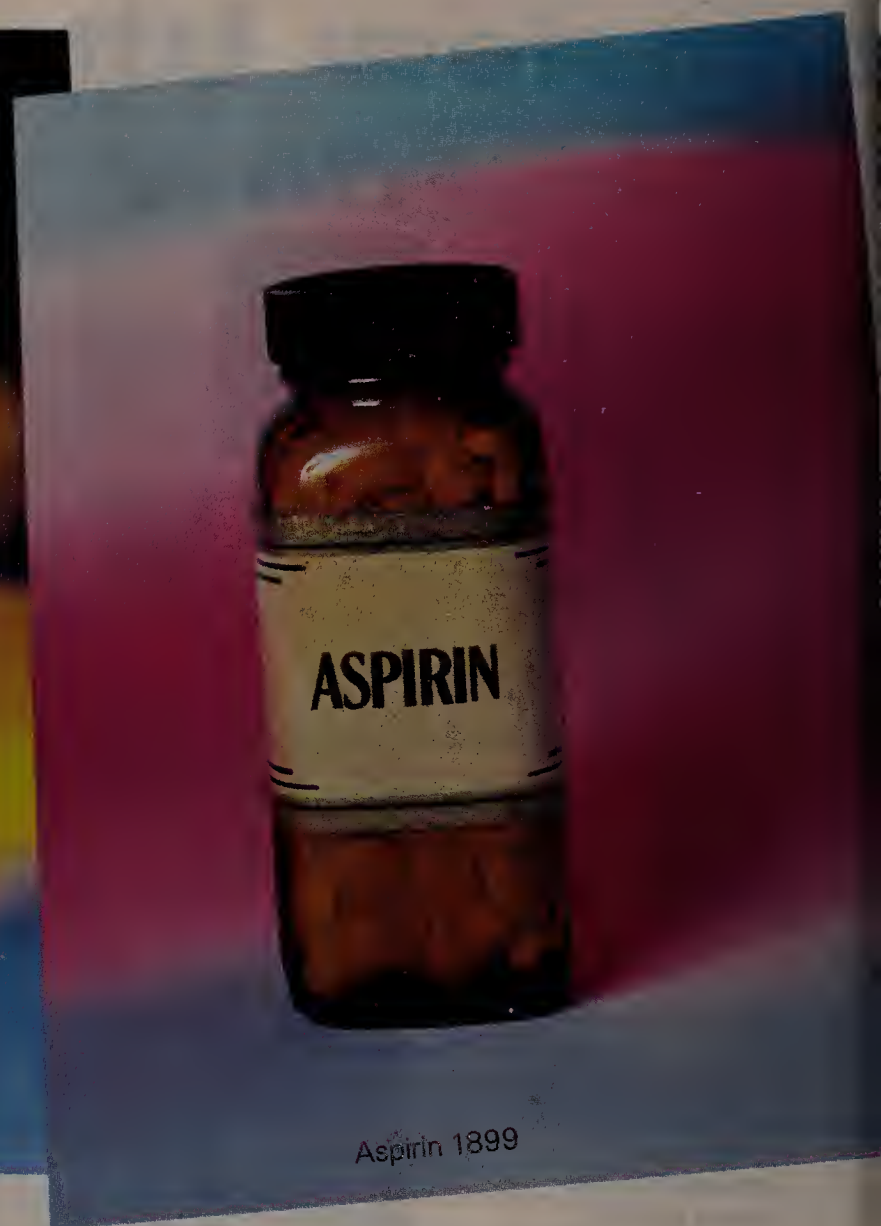
The Light Bulb 1879



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Exactly how fast is graphics performan Image™ Series PCs?

Let's just say we developed Image Video™ technology expressly for all you high-performance speed demons. Fact is, we've engineered our Image™ Series PCs with a powerful combination of our second-generation local bus and graphics accelerator, allowing graphics information to travel directly between the CPU and video memory, so Windows™ is a breeze and you can sprint through today's most demanding graphics applications.

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FASTEST NUMBER-CRUNCHING PCs FOR $3000

Number-crunching power once available only to specialists can now be yours for $3000 or less. We pick the best of the best from 25 vendors.

Today's business applications demand more of your computer than ever before. If you regularly use a high-powered spreadsheet, desktop publishing program, accounting and statistics package, business graphics application, or database, your system's raw processing power may be taxed to its limit. The load could be especially heavy if you run several of these apps simultaneously under *Windows* or OS/2. You likely find yourself wanting to buy a machine that is fast enough to handle the ever more punishing requirements of new software—without punishing your wallet too severely.

With that premise, we went shopping the way you do: with a fixed budget and a specific use in mind. We asked 25 vendors to send us the fastest machine they had that cost $3000 or less direct or on the street and would be especially good for spreadsheets and other applications that rely heavily on the processor's performance. We let each vendor decide virtually every detail of its system's configuration—the amount of RAM, the amount of secondary memory cache, the type and capacity of the storage subsystem,

ROBERT CARDIN

BY BRYAN HASTINGS AND DAN MILLER

Clockwise from top left: Polywell Poly 486-66V, Diamond DT 486VL, Axik Ace Cache 486V, Micro-Niche M466, NEC Image 466

the type and resolution of the video controller, and so on. The one thing we insisted on was that the systems use one of Intel's 486DX or DX2 processors, the fastest CPUs found in desktop PCs today. Of the 25 systems we received for this review, 21 used the clock-doubling 33/66-MHz 486DX2; the rest were based on the 50-MHz 486DX.

486DXs are the only desktop CPUs that feature an internal FPU (floating point unit), ideal for certain types of numeric-intensive operations. Of course, most of today's applications don't make use of the FPU. In fact, for most calculations, the 486DX's standard instruction set handles the math; the FPU is never invoked. The FPU shines, however, in calculations involving fractions and very large numbers, blitzing through them up to 20 times faster.

High-end applications do entail such calculations. Recalculating giant spreadsheets filled with formulas, cross-tabs, and lookup tables; editing large-scale graphics and rearranging pages in a desktop publishing program; or running extensive queries in your relational database application—all could rely on the FPU, depending on the application. According to Intel, more than 1200 applications on the market today specifically make use of the FPU.

To find out just how fast the reviewed machines are in everyday use, we ran them through the BAPCo test suite, which incorporates a variety of popular DOS and *Windows* applications in six application groups (spreadsheet, word processing, database management, desktop publishing, graphics, and software development). We also put them through our *Windows* tests, which include *Word*, *Freelance*, *Paradox* (the DOS version run in a window), and *Excel*. To discover which machines are best for number-crunching applications, we paid special attention to the results of the various spreadsheet tests, which use the FPU.

Best Buys

While we emphasized performance, we didn't ignore other considerations. Price mattered, as did service and support and design quality. As a result, our five Best Buys are a diverse crowd. While the NEC, Polywell, and Axik were in our top five for performance, the other two finished in the middle of the pack. Only one—the MicroNiche—is in the top five for price. The key is to excel at one or two things and do at least fairly well at everything else.

1. **NEC Image 466** (page 154)
2. **Polywell Poly 486-66V** (page 156)
3. **Diamond DT 486VL** (page 149)
4. **Axik Ace Cache 486V** (page 140)
5. **MicroNiche M466** (page 153)

THE NEC IMAGE 466: A Best Buy that is fast today and even faster tomorrow, thanks to its OverDrive for DX2 upgrade socket.

Running the Numbers

When the results for all the tests were in, the systems using the DX2-66 were, on average, about 9 percent faster than the DX-50s. The differences were most pronounced in BAPCo tests: In the spreadsheet section, the 66s were almost 20 percent faster than the 50s. The differences were smaller in our *Windows* benchmarks, because so many system components beyond the processor (such as the disk and video subsystems) come into play; in the *Excel* test, for example, the 50s were actually fractionally faster on average than the 66s. Still, for general business use—especially on DOS applications—until we start seeing systems and upgrade chips using Intel's new Pentium technology, the DX2-66 is your best bet for speed.

Blazing processor performance isn't much use if system memory can't keep up. That's why the top systems reviewed are configured with healthy dollops of RAM. All but four of the computers came with at least 8MB, four had 16MB, and none had less than 4MB. Our tests show that 8MB gives you the most bang for the buck.

For a truly high-end system, having enough RAM isn't sufficient—you also need a way to maximize the RAM's efficiency. That's why all but one of these vendors added some kind of RAM cache to their system (Silicon Valley was the lone exception). The theory is that by stashing recently used data and instructions in cache RAM (which is four to five times faster than conventional system memory), you reduce the number of times the CPU has to go to system memory, improving overall performance. Once again, since spreadsheets in particular benefit from a fast and efficient memory system, they respond especially well to a RAM cache.

All these systems have some cache, because all 486DXs and 486DX2s have an internal 8K cache. Additional cache outside the microprocessor is known as secondary, or external, cache. Seventeen of the machines we looked at were equipped with a hefty 256K of secondary cache, four came with 128K, and three had 64K.

In previous tests, we found that 64K of RAM cache was enough to boost system performance significantly, and adding more usually yielded diminishing returns. In this review, we could only compare the cached systems with one cacheless machine. Still, overall we found that systems with 64K caches were, on average, 6 percent faster than the one without a secondary cache, while the systems with 256K caches were 8 percent faster. The performance advantage of secondary caches was greater in the BAPCo spreadsheet test than in the *Excel* test. The upshot is that you should get some RAM cache in your spreadsheet machine, but don't feel you need to load in all it can take.

What You See Is What You Get

While the CPU and memory subsystem are considered the most crucial to spreadsheet performance, other components have an impact too. One of the most important: the video subsystem.

Virtually all these systems use graphics accelerators to speed video processing—good news for *Windows* applications.

Most vendors attach their graphics controllers to the ISA bus, which trundles information between the CPU and the video adapter at a slow 8 MHz, 16 bits at a time. A couple of systems, however, use their CPU's local bus instead. A local bus expansion slot communicates directly with the processor at motherboard speeds (50 MHz in DX-50 systems, 33 MHz in DX2-66s), making it much faster than the old ISA or even the 32-bit EISA bus. However, only the most graphics-intensive applications currently pump enough data through the bus system to derive much advantage from local bus designs over an accelerated ISA video controller.

Several of these high-speed bus designs follow the Video Electronics Standards Association's local bus standard (VL-bus), while others are proprietary. Overall, the DX2-66 VL-bus systems in this review were faster than their non-VL-bus counterparts. The VL-bus systems were particularly fast in our *Windows* tests—they beat the ISA-only machines by almost 13 percent in *Freelance*. On the other hand, there was little difference between the VL-bus systems and the ISA-only machines in our *Excel* test.

Of course, the speed of the bus isn't the only thing you should consider when looking at video specs. No matter how fast your PC runs, a high-resolution, high-refresh-rate video system can make a big difference when you have to stare at spreadsheets all day. Almost every system we looked at supports 1024-by-768-pixel resolution with an easy-on-the-eyes 70-Hz refresh rate—you should insist on nothing less. While most of the systems come with 14-inch monitors, the Ariel, Gateway, Insight, NEC, and Touche PCs come with 15-inch displays.

Speeding Up the Hard Drive

Another component to consider when looking for maximum speed: the hard drive. A slow drive will cost you every time you save a file. Thus, the best way to optimize the performance of your storage system is to use disk caching. A disk cache reads the data requested by the operating system and then the data that follows; chances are the

Best Performance

If you want to maximize performance, you have to do more than use a fast CPU. All the top five performers have a DX2-66, but then so do most systems in this review. Our top five speedsters support their fast processors with 8MB of RAM and 256K of RAM cache.

1. **CAF Gold 6D2** (page 146)
2. **NEC Image 466** (page 154)
3. **Axik Ace Cache 486V** (page 140)
4. **Polywell Poly 486-66V** (page 156)
5. **ALR BusinessVEISA 4/66d Model 170DW** (page 138)

Best Price

Our only guideline for this review was that systems cost less than $3000 on the street. Fourteen machines made it in under our price ceiling, while four others are less than $100 over. And lower prices don't necessarily mean slower speed: Almost all these price leaders performed credibly.

1. **Netis 486DX2-66 Local Bus System** (page 154)
2. **Micro Express ME MicroFlex 486DX2-66** (page 153)
3. **Silicon Valley 486DXC2/66 Turbo** (page 156)
4. **MicroNiche M466** (page 153)
5. **Acma 486DX2/66 Workstation** (page 138) **and Blackship BLK 486/50E** (page 146)

Best Service and Support

By offering a three-year warranty plus lifetime tech support, Compaq has raised the standard for service and support the way it set new price levels last year. Though other vendors may not match Compaq's service package, you will find longer warranties today and better tech support than ever before.

1. **Compaq Deskpro 4/66i Model 120/w** (page 146)
2. **ALR BusinessVEISA 4/66d Model 170DW** (page 138)
3. **Micro Express ME MicroFlex 486DX2-66** (page 153)
4. **Blackship BLK 486/50E** (page 146)
5. **Axik Ace Cache 486V** (page 140)

next request will be for that following data, and the disk cache will be ready to hand it over. The larger the cache, the more it pulls in, and the better the chance that the next bits your PC needs will be waiting for it.

In review after review, we've found that caching disk controllers are the surest way to improve overall performance. Nine of the systems reviewed arrived with caching controllers, and their test scores reflect their performance advantage. After accounting for differences in CPUs, systems with caching controllers were 11 percent faster than those without; the speedup was almost twice that in the BAPCo suite alone.

A high-resolution, high-refresh-rate video system can make a big difference when you have to stare at spreadsheets all day long.

While we asked vendors to supply us with systems under $3000 (direct or on the street), the systems actually ranged widely in price, from $1990 for the system from Netis to $3543 for the ALR. We gave vendors some credit for being under the $3000 barrier and penalized them for being over. For vendors that sell direct to end users, we used the prices they quoted us during the research for this review for the configuration they gave us. For vendors who sell through retail channels, we called stores around the country to get an average street price. The average system cost $2930; the DX2-66s averaged about $15 more than the DX-50s.

We took a look at the quality of each vendor's customer service and support. We checked out the length of warranties, the terms for on-site service, and the turnaround time for factory repairs. We made a series of anonymous calls to the vendors' tech support to find out how quickly they answered the phone and how accurately, courteously, and thoroughly they solved some typical problems.

Finally, we evaluated each system's design and expandability. We checked motherboards to be sure the switches and jumpers were easily accessible and didn't force you to dismantle drive cages or

Acma 486DX2/66 Workstation

VITAL STATISTICS

Street price: $2795
PROS: Fast, good price
CONS: Small glitches in customer service
Contact: Acma Computers, 800/786-6888, 510/623-1212
Reader service no. 655

Like a meal at a fast-food restaurant, the Acma is fast and cheap. At just $2795, the Acma is one of the six least expensive PCs here. Despite the price, it barely missed our top five for performance in a generally speedy crowd. If it hadn't been for a couple of glitches in service, this would have rated a Best Buy.

The system did especially well in the graphics section of the BAPCo tests and the *Paradox* section of our *Windows* suite. Its numbers on our spreadsheet tests were good, if not great: It was 8 percent faster than the average on our *Excel* test, and a bit ahead of the average on the BAPCo test.

Why is it so fast? Because inside the generic tower case, you'll find some particularly tasty hardware. The menu includes a DX2-66 processor, a generous 16MB of RAM (upgradable to 64MB), and a 256K RAM cache. A Conner hard drive coupled to a Promise caching controller loaded with 2MB of cache handles storage, while an NDI Volante Warp 10 (using S3's 801 graphics accelerator chip) drives the display. If you want to expand, five of seven ISA slots are free (the other two are taken up by video and drive controllers). The Acma has three externally accessible 5¼-inch drive bays, but since it uses a combo floppy drive (5¼- and 3½-inch drives together in one bay) you still have room for two more storage devices.

Acma includes a side order of (mostly) solid customer support. You get a standard one-year warranty and, for $45, a year of on-site service. The tech support office is open six days a week, and you can also post questions on a BBS or via fax. When we called, the tech support staff answered their phones quickly, but some of their answers were off the mark. Also, the company takes four days to turn around factory repairs.

Despite these minor service problems, this PC is still a tempting buy for the price. It's worth considering if you want a cheap way to satisfy your hunger for computing speed.

ALR BusinessVEISA 4/66d Model 170DW

VITAL STATISTICS

Street price: $3543
PROS: Very fast, good service and support, extremely expandable
CONS: Most expensive system
Contact: Advanced Logic Research (ALR), 800/444-4257, 714/581-6770
Reader service no. 656

Owning the ALR BusinessVEISA is a bit like flying on the Concorde: it's really fast, and the service is impeccable. In our *Excel* test, it was just 7 percent slower than the fastest system; it also did well on the BAPCo spreadsheet tests, 10 percent ahead of the average. Adding in the results from the rest of our tests, this was the fifth fastest PC here.

In addition to the supersonic speed, the BusinessVEISA also features some smart design. The integrated hard drive interface for the Seagate drive uses DMA (direct memory addressing) to write and read data directly between the drive and memory, bypassing the CPU. The motherboard is cleanly laid out: The SIMMs, hard drive, and seven free EISA slots are all easily accessible, and the wiring is

power supplies to get at them. If you want to speed up your system with more memory or RAM cache, a faster video card, or a caching disk controller, properly placed expansion slots, jumpers, and switches can make the job a whole lot smoother. We awarded big points if the system came with a socket to accommodate the Pentium-based OverDrive for DX2, due out next year.

The Winner's Circle

Taking performance, price, service and support, expandability, and design into account, we came up with five systems that most deserve your consideration for use with spreadsheets and other processor-intensive applications. Our top machine is NEC's Image 466, followed by Polywell's Poly 486-66V, Diamond's DT 486VL, Axik's Ace Cache 486V, and the MicroNiche M466.

Four of the five top systems are based on the 66-MHz processor; the Diamond uses the 50-MHz CPU. All but one come with 8MB of RAM (the MicroNiche has 16MB), and all the Best Buys have 256K of external cache RAM. Two use caching disk controllers. All but the NEC use VESA local bus video; the NEC uses a proprietary local bus design. All but one cost under $3000; the top-rated NEC costs $3109.

Of course, you should give some thought to the future when you buy a system. We should be seeing the first Pentium-based systems by the time you read this review. However, this isn't any reason to put off buying now, especially if you can find a system with one of those extra-large OverDrive sockets. A speedy 486DX-50 or 486DX2-66 with all the right supporting components will give you plenty of power for spreadsheets and other processor-intensive applications, now and for years to come.

Bryan Hastings is an associate editor and Dan Miller an assistant editor for PC World. *They can be reached as B HASTINGS and DAN MILLER on PC World Online (see page 10 for more information).*

For more information about all products in this article, circle reader service no. 903.

neatly tied together. ALR could have installed faster EISA video and disk controllers instead of the integrated Western Digital video accelerator and IDE hard drive adapter.

We were impressed when we tested ALR's customer service crew. Their answers were quick, courteous, and accurate. The system comes with the standard one-year warranty and a three-day turnaround on factory repairs; a year's on-site service is just $9.95.

Like flying on the Concorde, though, the BusinessVEISA is going to cost you. At $3543, it's the most expensive box here. In its base configuration, it sells for $2999; that doesn't include the monitor or the 256K cache ALR sent us. However, ALR tells us this system should sell for about $3200 by the time you read this, making it a much more attractive value. At its current price, however, the ALR can't compete with boxes that are just as fast but cost less.

Ariel 486DX2-66VLB

VITAL STATISTICS

Street price: $2995
PROS: Borland software bundle, local bus video
PROS: Subpar Windows performance, short on RAM
Contact: Ariel Design, 800/882-7435, 617/982-8800
Reader service no. 657

Even though it is competing against faster and cheaper systems, this dark horse came on fast from the outside and was close to earning a Best Buy recommendation at the finish.

We would not have bet on such an impressive overall showing after timing the Ariel in our test workouts. Though the system finished a bit ahead of average on the BAPCo spreadsheet tests and logged a good time on the word processing test, it finished a little below average on the BAPCo suite as a whole. It had even less success with *Windows;* it was 19 percent below average on *Excel.*

The Ariel doesn't win any prizes for looks, either; its appearance is as nondescript as its performance. Its tower case is virtually indistinguishable from several others in the review. Closer inspection, however, reveals some far-from-generic design decisions. The system comes with NDI's Volante Warp 10 local bus video board in one of two VESA local bus slots; the motherboard has six 8/16-bit ISA slots free. The tower case has four externally accessible drive bays; two are free. Although Ariel supplied this PC with only 4MB of RAM, memory can be expanded to 64MB supported by a 256K cache. A nice final touch: The price includes a 15-inch monitor.

As for service and support, Ariel's small (one- or two-person) tech support department did a good job handling our calls. The company provides the standard one-year warranty and charges a modest $50 for a year of on-site service. Ariel sells this system direct for $2995, just $5 under our price ceiling; for the money, the company throws in your choice of one of three Borland software packages (*C++*, *Quattro Pro*, or *Paradox).* Thanks to this software, the Ariel finished strong in our evaluations but just misses a Best Buy.

AST Bravo 4/66d Model 123B

VITAL STATISTICS

Street price: $3017
PROS: Good speed, especially for Windows
CONS: Limited expansion options
Contact: AST Research, 800/876-4278, 714/727-4141
Reader service no. 658

In previous reviews, we've applauded the AST Bravo for its low price and good *Windows* performance. In an encore appearance, however, the veteran AST system gets upstaged.

The Bravo gave bravura performances in the *Freelance* and *Paradox* sections of our *Windows* suite; its *Excel* numbers were good but less impressive. Thanks in part to its integrated Cirrus Logic video chip, it did especially well in the BAPCo graphics test.

The AST's case has just one free drive bay, and it's internal, so you can't add any other devices requiring accessibility (a small 122MB Quantum hard drive occupies the other internal bay). However, because the video and drive controllers are integrated on the motherboard, you get four free ISA slots. The motherboard also has room for 64MB of RAM (the system we tested had 8MB) and came with a 256K cache.

Behind the scenes, AST's service and support is reasonably good. In addition to the standard one-year warranty, you get a year of on-site service free of charge. The technical support staff is on the job 14 hours a day; unfortunately, they were off-base answering one of our questions. Also, AST only guarantees to turn around factory repairs in seven days.

What really hurts the AST in this month's production is that its $3017 price is more than its audience may want to pay; over half the other systems here cost less. Given the competition on price and speed, we can't give the AST the thumbs-up in this roundup.

Austin 466DX2 VESA-LB

VITAL STATISTICS

Street price: $3099
PROS: 238-pin CPU socket
CONS: Slow on BAPCo tests, service glitches, relatively expensive
Contact: Austin Computer Systems, 800/752-1577, 512/339-3500 (fax)
Reader service no. 659

Based on its specs alone, you'd think this Austin system would be one fast PC. The system is built around a DX2-66. The motherboard has two VESA local bus slots, one of which is occupied by a video card based on S3's 805 video accelerator chip. The 128K RAM cache is smaller than on some of the other systems, but according to our tests, it should help performance almost as much as a 256K cache.

Too bad the 466DX2 VESA-LB's performance doesn't live up to its specs. Its scores were below average on all but one of our *Windows* tests, and its BAPCo scores were nearly 14 percent below the overall average.

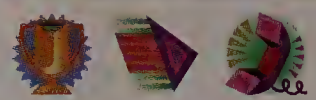
If you want faster performance in the future, the relatively small 4MB of installed RAM is upgradable to a maximum of 64MB. This is one of two systems reviewed here that comes with a 238-pin CPU socket, which means you'll be able to upgrade to a Pentium-based OverDrive for DX2.

Austin's customer support policies are good: The company offers 24-hour, toll-free tech support seven days a week and a year of free on-site service. Still, the Austin 466DX2 VESA-LB can't keep up with the faster systems we looked at, which means the Austin is not the best value this time around.

Axik Ace Cache 486V

VITAL STATISTICS

Street price: $2898
PROS: Fast on DOS apps, excellent customer service
CONS: Some design clutter
Contact: Axik Computer 408/735-1234, 408/735-1437 (fax)
Reader service no. 660



This wide minitower system may not be pretty, but then this ain't a beauty contest. In everything that really counts—performance and price—it's attractive enough to earn a Best Buy.

For overall performance, the Axik beat all but two other systems hands down. It really smoked on the BAPCo test suite—nearly 17 percent ahead of the average for the spreadsheet section, with strong scores on the database and graphics tests to boot. While it was a bit less impressive in our *Windows* suite, it still turned in good times in our *Word* and *Freelance* tests.

This attractive performance comes from a DX2-66 working with 8MB of RAM (out of a maximum 32MB) and a 256K secondary cache. The Quantum hard drive is connected to a Promise SuperIDE caching controller with 1MB of cache, which helps explain the system's good times on the disk-intensive database and graphics tests. The video chores are handled by a no-name VESA local bus video card based on ATI's Mach 32 chip.

The stocky chassis also has room for plenty of expansion. You get five externally accessible drive bays, three of which are free to hold tape or CD ROM drives; two of the three internal bays are free as well. You also get seven expansion slots: two 32-bit local bus, four 8/16-bit, and one 8-bit. One of the local bus slots is occupied by the video board, but the other is filled by a regular 16-bit I/O card. Why a 16-bit card in a local bus slot? The cables wouldn't reach the I/O ports otherwise. These cables also obscure the SIMM slots—you'd have to detach them to upgrade the memory. However, this is a small shortcoming in an otherwise well-designed machine. Our other complaint will probably not apply to shipping units: The documentation we received consisted of some minimal photocopies; we assume the final, shipping version will be more complete.

Although Axik's tech support department is small (as with Ariel, the staff seems to consist of one or two people), they are knowledgeable and helpful. Their responses to our anonymous calls were quick and accurate. Customer support policies are solid: Axik offers the standard one-year warranty, a year of free on-site service, and two-day turnaround guaranteed on factory repairs. Our only complaint: Tech support is open just 9½ hours a day.

While you might expect to pay top dollar for a system with this much speed and expandability, the Axik actually came in $102 under our $3000 price ceiling—right in the middle of the price range for this review. This combination of good speed and reasonable price is just what we are looking for, which is why this Axik earns our Best Buy recommendation.

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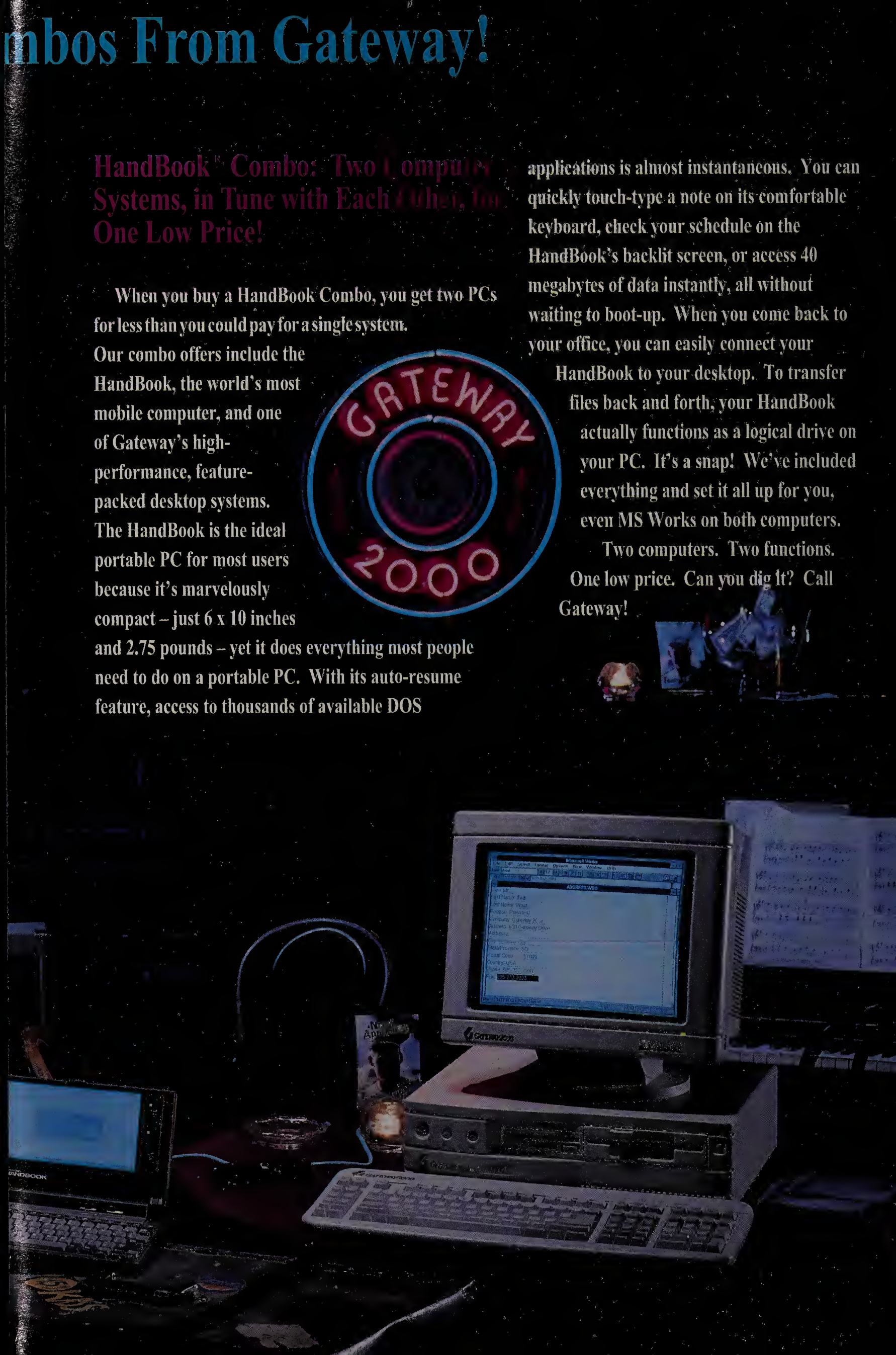

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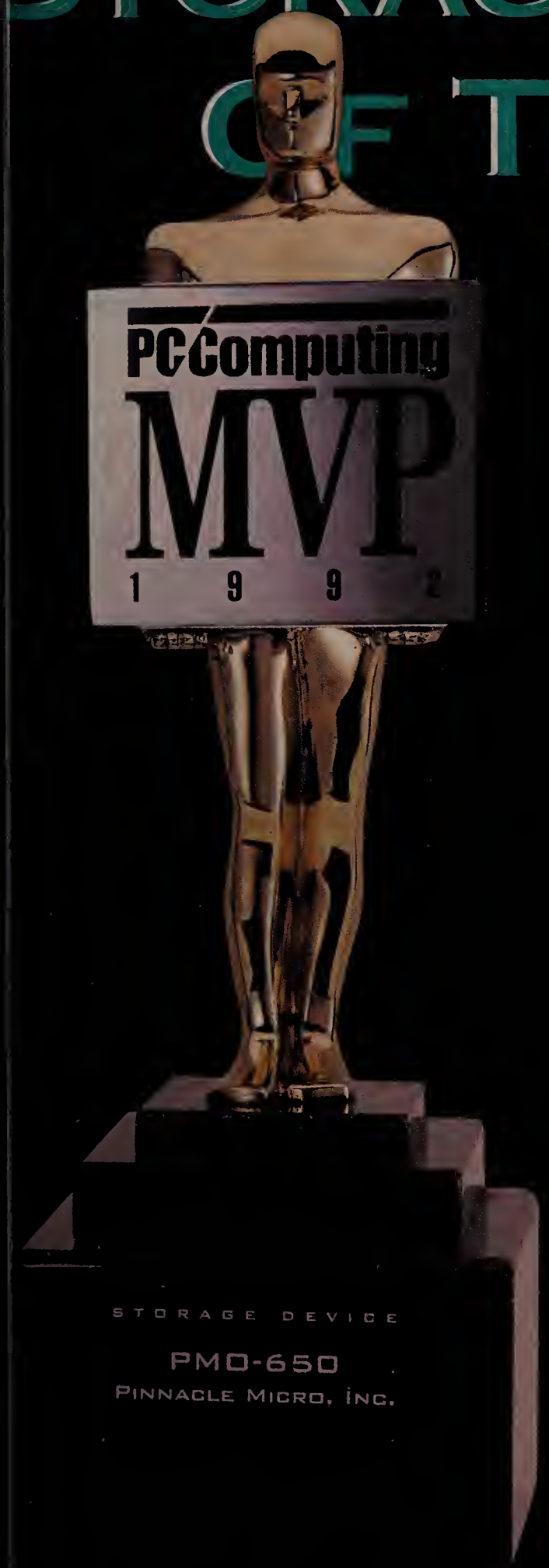

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Blackship BLK 486/50E

VITAL STATISTICS

Street price: $2795
PROS: Good service, low price
CONS: Comparatively slow
Contact: Blackship Computer Systems, 800/531-7447, 408/432-7500
Reader service no. 661

Unlike most of the other vendors in our computing speed contest, who sent in systems based on the DX2-66, Blackship entered a DX-50. Unfortunately, that's like pitting a stock car against a bunch of drag racers: While the Blackship might be fast compared to some systems, it can't keep up with this high-octane crowd. Overall, it's the second slowest machine in the review, and the slowest of the four DX-50s. It did well enough in our *Windows* tests, finishing the *Excel* test almost 8 percent ahead of the average. It had trouble, however, in the BAPCo suite; it finished the BAPCo spreadsheet tests dead last.

Except for the CPU, Blackship customized the system well for the task we set it. It comes with a plain 14-inch monitor connected to an Orchid video adapter for a speedy, flicker-free display—just enough video power for everyday business apps. The cleanly laid out motherboard holds 16MB of RAM (out of 64MB maximum) along with a 128K RAM cache. The hard drive is a Maxtor.

As usual, Blackship's service and support is quite good. The tech support pit crew answered our calls promptly and accurately, and the company gives you a year of free on-site service and a two-day turnaround on repairs. Unfortunately, the tech support lines are open just 9 hours a day. At $2795, the Blackship places in our top five for price, which will make it attractive for budget-conscious buyers. If you're looking for top speeds, however, this Blackship can't keep up with the faster 66s.

CAF Gold 6D2

VITAL STATISTICS

Street price: $2884
PROS: Fastest system here, good price, lots of expandability
CONS: Subpar service
Contact: CAF Technology, 818/369-3690
Reader service no. 662

You wanna talk *fast*? The CAF Gold 6D2 takes over as the speediest system we've ever tested. For spreadsheets, it placed second on our *Excel* test (just fractionally slower than the NEC), and it was the third fastest on the spreadsheet segment of the BAPCo suite (nearly 15 percent ahead of the average). It also did well in just about every other test we put it through, particularly in the database, desktop publishing, and software development segments of the BAPCo suite.

How do you build such a fast system? Start with a DX2-66. Connect the Maxtor hard drive to a SuperIDE caching controller filled with 8.5MB of cache. Throw in 8MB of RAM supported by a 256K secondary cache. Finally, let a speedy OEM video card based on Western Digital's 90C31 accelerator handle the graphics.

Like a rocket without a parachute, however, a speedy system isn't much good without some backup when things go wrong. Unfortunately, CAF received one of the worst service and support ratings in this review. It wasn't the tech support staff—they answered our questions with 100 percent accuracy. The problem is the company's customer support policies: There's no on-site service, no BBS support, and the technical support lines aren't toll free.

Despite the subpar service, however, the CAF Gold 6D2 is an extremely fast machine for a reasonable price. If that's all you want, consider buying the CAF.

Compaq Deskpro 4/66i Model 120/w

VITAL STATISTICS

Street price: $3120
PROS: Three-year warranty, good Windows performance
CONS: Relatively expensive, limited expandability
Contact: Compaq Computer, 800/345-1518, 713/378-8820
Reader service no. 663

First Compaq forced the rest of the industry into a price war. Then it raised the standard for service and support. On this and other Deskpro's, Compaq now offers a three-year warranty and free 24-hour tech support for the system's lifetime. And that tech support is *good*. The Compaq staff answered our calls with alacrity, and their responses were right on the money. As a result, Compaq earned the top spot for service and support in this review.

This Deskpro is fast, too, especially with *Windows*. It finished our *Excel* test in third place, less than 4 percent behind the leader and nearly 22 percent ahead of the average. The good *Windows* scores can be credited, at least in part, to Compaq's speedy QVision graphics. The system was less successful in the BAPCo test suite, particularly on the database and software development segments (suggesting the disk subsystem might need a little fine-tuning). Still, the sprightly *Windows* performance was good enough that the system was close to making our top five for overall performance.

We also like this Deskpro's cool design. Inside the compact case, the system is configured with 8MB of RAM and a 64K secondary cache, both of which should be more than enough for everyday use. You get Compaq's Business-Audio hardware, which may not be high fidelity but should be good enough for adding voice annotations to *Windows* documents. The 122MB Quantum hard drive is one of the smallest of the systems reviewed here, but, as Compaq

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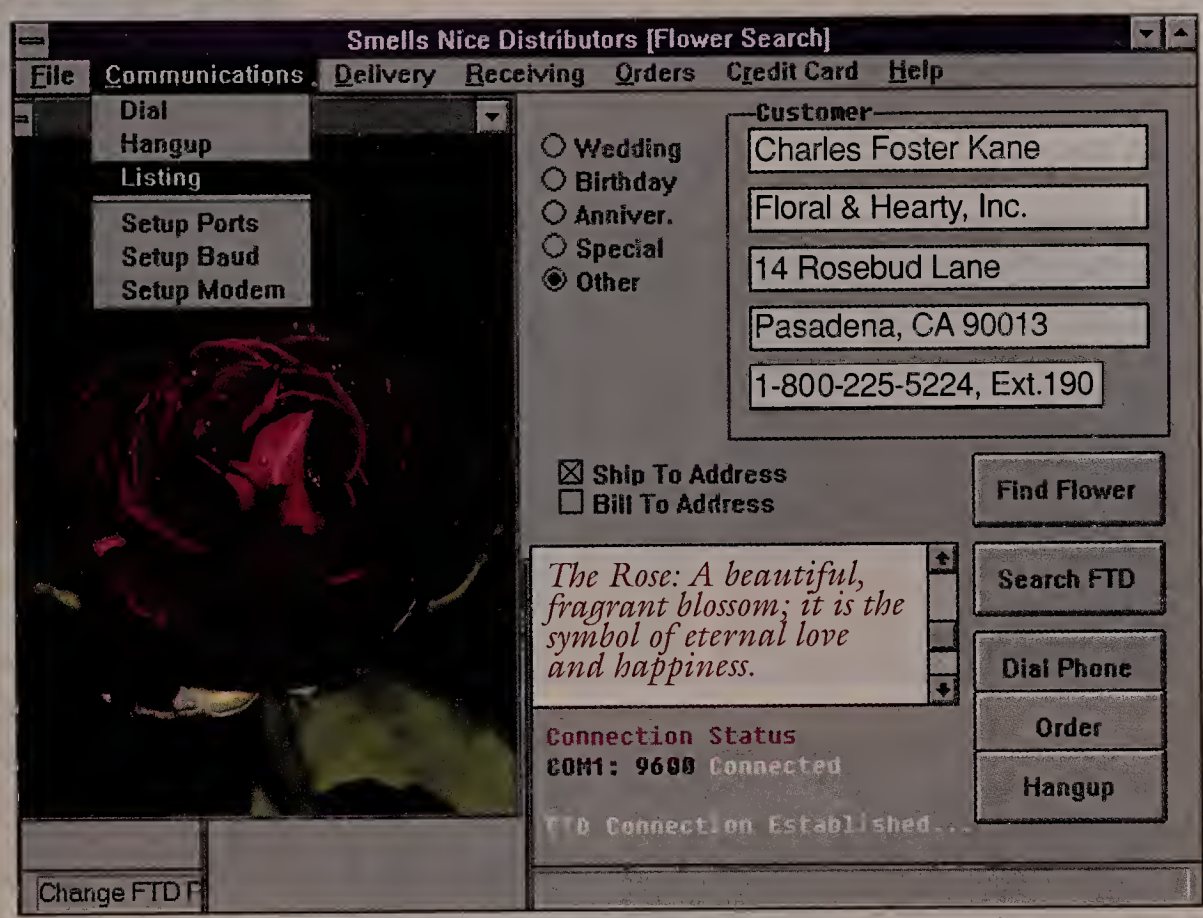

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pointed out when submitting the system, bigger hard drives don't necessarily mean better performance.

As we've noted before, the Deskpro can't compete with bigger systems when it comes to expandability. The system has just three drive bays (two of them externally accessible), and all of them are already occupied. If you have access to a network tape drive or CD ROM, this may not matter; if you're using a Deskpro as a stand-alone machine, however, it could be a problem. A riser card holds just three expansion slots. However, since video and drive control are integrated on the motherboard, you may not need more.

The big problem with the Deskpro is price. Its $3120 price tag isn't that far over our $3000 price ceiling, but it's expensive compared to many systems here. Still, if you want good *Windows* speed and one of the best service contracts in the industry, and you don't mind paying a bit extra, the Deskpro is worth serious consideration.

CompuAdd 466DX2 Desktop Power

VITAL STATISTICS

Direct price: $3016
PROS: Good customer service policies, lots of room to grow
CONS: Slowest in review
Contact: CompuAdd Computer, 800/456-3116, 512/250-1489
Reader service no. 664

Using all the right ingredients doesn't always guarantee a gourmet meal. Take this CompuAdd system. It uses a DX2-66. It has 8MB of RAM (upgradable to 64MB) and a 256K cache. To top it off, it has a CompuAdd Hi-Rez brand video card in a proprietary "hot-slot," which is a 16-bit slot configured to run at 12.5 MHz (instead of the usual 8.3 MHz).

Despite the appetizing hardware, this DX2-66 is slower than all four of the DX-50s we tested. It took almost twice as long to finish our *Excel* test as the fastest system; in fact, it had problems with our *Windows* tests in general (perhaps because the video card is based on Western Digital's nonaccelerating 90C30 chip). The system did better on the BAPCo tests, particularly the desktop publishing and word processing sections. Remember that by any general measure, this system is fast; it just isn't as fast as the other speedsters in this roundup.

Unfortunately, the competitive picture doesn't brighten when you look at price. CompuAdd sells this system for $3016, just $16 over our limit, but still in the bottom half of the price range for this review. Service and support policies are generous—24-hour, 7-day-a-week tech support, a one-year warranty, a year of free on-site service, and three-day turnaround on repairs.

This system gives you plenty of room for expansion. The desktop case holds seven ISA slots (six of which are free) and seven drive bays. Five bays are externally accessible; one of the two internal bays holds a 119MB Western Digital hard drive. Too bad we aren't looking for systems with lots of room. For a speedy number cruncher, we'd advise you to look elsewhere.

CompuAdd Express 466DX2

VITAL STATISTICS

Direct price: $2895
PROS: Low price, bundled software, good service
CONS: Average speed, cramped for space
Contact: CompuAdd Express, 800/925-3000, 512/219-1800
Reader service no. 665

At $2895, this system is well under our $3000 ceiling. That price includes your choice of *LotusWrite for Windows*, *LotusWorks*, *Lotus Organizer*, and *1-2-3 for Home*. It also buys you some of the best service and support we've found. You get a year of free on-site service and a three-day turnaround on repairs. When we called CompuAdd Express's tech support lines, the staff answered our questions quickly, accurately, and courteously.

Unfortunately, when it comes to performance, this system can't compete with the other speed demons here. While it produced a good time on the *Freelance* section of our *Windows* test, it didn't fare well on our other tests (despite being loaded with 16MB of RAM and 128K cache). Overall, it ranked 20th on our performance charts, nearly 38 percent behind the leader.

This box also lacks some of the expansion options you get from other systems. It has only three drive bays, all of them filled. It has five expansion slots, all free, but two are for 8-bit cards only. To its credit, CompuAdd Express has a more expandable desktop model available, which should cost another $100. In the system at hand, however, good service and a low price aren't enough to offset relatively slow performance and limited expandability.

CUI Advantage 486-66DX2

VITAL STATISTICS

Street price: $3741
PROS: Good speed for DOS, great expandability
CONS: Expensive, slow on Excel
Contact: CUI, 800/458-6686, 408/241-9170
Reader service no. 666

If you want an advantage running DOS apps, this box from CUI could be for you. Thanks to strong performances in the database, graphics, and software development sections, it came in a surprising fourth for the BAPCo suite overall. It had a harder time with our *Windows* tests: its *Excel* score was 43 percent lower than the fastest.

The CUI uses an UltraStor 15C caching hard drive controller attached to a Quantum hard drive and a no-name video card based on Tseng's ET4000 chip. The system we tested has 8MB of RAM

installed (out of a maximum of 64MB) and a 256K cache. The big metal case gives you a whopping ten drive bays (seven are free).

CUI offers no turnaround repair policy and no tech support fax line. While it has a one-year warranty, CUI charges $140 for a year of on-site service. Tech support lines are open just nine hours a day, and when we called, some of our questions were answered incorrectly. You expect more for $3441.

DECpc 466d2 LP

VITAL STATISTICS

Direct price: $3049
PROS: Great design
CONS: Relatively slow
Contact: DEC, 800/722-9332
Reader service no. 667

We've said it before and we'll say it again: DEC PCs look great. Each comes in a solid, low-profile metal case with a sleek, minimalist front panel. The system we looked at had just one 3½-inch drive installed, but there's a bay available for a 3½- or 5¼-inch device.

The nice design continues inside the case. The CPU is on its own daughterboard, with a 256K secondary cache. There's 8MB of RAM installed on the main board that you can upgrade to 64MB with standard SIMMs. Data is stored on a Quantum hard drive. As with other compact systems, you sacrifice a bit on expandability—there are just three slots on a riser card. However, because the S3-based local bus video system and the drive connector are integrated on the motherboard, all three slots are free.

The DEC was a bit of a disappointment when it came to performance. Overall, it was 12 percent slower than the average system here. While service and support are fine (the only serious problem is no turnaround policy for repairs), and the system's price is just $49 over our $3000 price break, its subpar performance is hard to ignore.

Diamond DT 486VL

VITAL STATISTICS

Direct price: $2875
PROS: Fastest DX-50, local bus peripherals, good price
CONS: None
Contact: Diamond Technologies, 800/989-7253, 714/252-1008
Reader service no. 668

In a review studded with gems, the Diamond is one of the crown jewels. Even though it uses a DX-50, this system manages to be fast enough, and cheap enough, to earn a Best Buy.

Overall, it is the fastest of the four DX-50s here. In our *Excel* test, it was slower than just three of the DX2-66s and tied with a fourth, only 7 percent behind the overall leader. It fared less well in the BAPCo tests; it placed 23rd in the spreadsheet test, for example, over 11.5 percent below the average.

Part of the reason for the Diamond's good *Windows* performance: It takes fuller advantage of the VESA local bus than any other system we've looked at. It uses a local bus video card based on S3's 805 chip, and storage is handled by a VESA local bus SCSI-2 host adapter connected to a Maxtor hard drive (the adapter also supports 2.88MB floppy drives). Remember that on a DX-50, that local bus is running at a full 50 MHz, not 33 MHz as on a DX2-66. The system we looked at also has 8MB of RAM installed (out of a possible 64MB) and a 256K RAM cache.

All this clever design is mounted in a nondescript plastic case. The motherboard is cleanly laid out and, for the most part, easily accessible. The documentation is extremely thorough, if a little too detailed for beginning users (but this is probably too much system for a beginner, anyway). Diamond's service and support are good: The warranty covers parts for 15 months and labor for 24 months, on-site service costs $75 for the first year, and Diamond guarantees to turn around repairs in two days. Diamond's tech support staff responded well to our questions.

How much will this system set you back? Surprisingly little. At just $2875, the Diamond comes in $125 under our price limit. With its low price, good *Windows* speed, and strong support, this system flouts the conventional idea that a DX-50 can't compete with a DX2-66. If you want a fast, cutting-edge system for a reasonable price, this Diamond is a definite Best Buy.

Gateway 2000 4DX2-66V

VITAL STATISTICS

Direct price: $3120
PROS: Very good spreadsheet performance, two VESA slots
CONS: Long waits on tech-support line
Contact: Gateway 2000, 605/232-2000, 800/523-2000
Reader service no. 669

Gateway, the company that's brought almost as much fame to cows as Ben and Jerry's ice cream did, sent us a bull of a desktop. If you've got the space to accommodate this machine's bulk, Gateway's 4DX2-66V is a solid all-around performer. Its 66-MHz DX2 processor, 8MB of RAM, and 64K of secondary cache let this machine stampede through spreadsheets; its *Excel* score is 15 percent better than the average. It has a great video system to view spreadsheets with, too. Its ATI video controller plugs into a VESA local bus slot, and it's one of only five machines in this review that comes with a large 15-inch monitor.

The speedy video controller helps account for this PC's hot performance on *Windows* software—the 4DX2-66V topped the chart in the *Freelance* test. The 4DX2-66V also offers a second, unfilled

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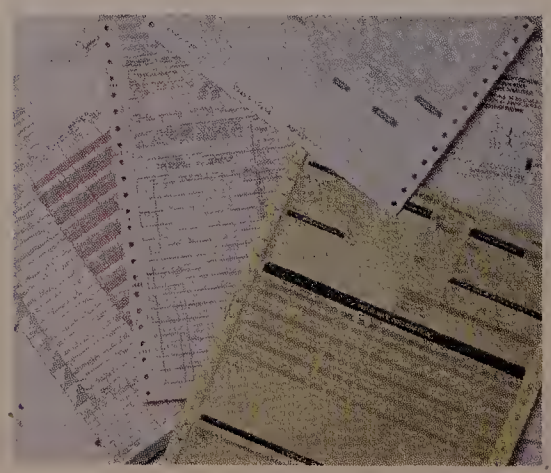

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TEXAS INSTRUMENTS

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VESA local bus slot, only one of a handful of machines in this review that does. The integrated disk connector is also local bus, but strangely enough, the 4DX2-66V's least impressive results were on the database tests, which require a lot of disk I/O. Overall, the 4DX2-66V's performance rating places it in the top third of all systems reviewed here. It also comes with one of the largest hard disks found on these systems, Western Digital's 325MB Caviar drive. One hardware quibble: The motherboard's internal switches are a little hard to reach.

The biggest weakness is Gateway's service and support. The company bit the dust on accuracy and responsiveness, and it won't commit to a time frame on factory repairs. Gateway has long hold times—sometimes more than half an hour. Those times may have shortened by the time you read this, because the company was working to beef up its support. Its tech support lines are open 18 hours a day, including Saturday. In short, this is a solid performer with good features from a major vendor—definitely worth a look.

Insight I486DX-50

VITAL STATISTICS

Direct price: $2999
PROS: Excellent disk and video subsystems, highly expandable
CONS: Generally poor service and support
Contact: Insight Computers, 602/902-1010, 800/755-9628
Reader service no. 670

If server-class machines were the subject of this review, Insight's tower would be a strong contender—it comes with a whopping 488MB hard drive from Fujitsu with 2MB of drive cache on the controller, eight expansion slots (including one for local bus), and six 5¼-inch drive bays.

Alas, even though the I486DX-50 comes well stocked with 8MB of RAM and 128K of secondary cache and did better than average on disk-intensive tests such as *Paradox*, it falls a bit below average for overall performance. This is likely due to the fact that its DX-50 CPU isn't quite the equal of the DX2-66s. The I486DX-50 scored below average for both the *Excel* and the BAPCo spreadsheet tests; in general, it tended to do better on the *Windows* applications tests than the BAPCo tests.

Other features commend the I486DX-50—its 15-inch monitor; comfortable, low-noise keyboard; well-laid-out motherboard with slots and jumpers easily accessible; and ample cooling from two fans. Documentation could be better; while you get a separate manual for everything, the system manual is written for several models and lacks many details specific to this machine. Insight's staff does work weekends and won points for courtesy, but answers to a couple of our questions were a bit off. The faulty answers, coupled with Insight's lack of on-site service, turnaround repair policy, and BBS support, hurt the company's service and support rating. For the price, unless you want all that expansion headroom, you'd be better off opting for one of our Best Buys.

Micro Express ME MicroFlex 486DX2-66

VITAL STATISTICS

Direct price: $2150
PROS: Great price, excellent service and support
CONS: Short on RAM
Contact: Micro Express, 800/989-9900, 714/852-1400
Reader service no. 671

Micro Express is known for its low prices on high-end systems, and the MicroFlex is a case in point. For $2150, you get a highly expandable minitower packed with a top-of-the-line 66-MHz CPU, 256K of external cache, a Western Digital 202MB hard drive and a controller equipped with 1MB of disk cache, and an Aview graphics accelerator.

If Micro Express had included more than a modest 4MB of RAM, overall performance might have been much better. Instead this PC falls just below average for overall speed. The MicroFlex did considerably better on the BAPCo tests than our *Windows* tests; on both the BAPCo spreadsheet tests and *Excel* tests it was in the middle of the pack.

The motherboard layout could be better: The secondary cache upgrade sockets are stuck behind a drive cage and the SIMMs are a little hard to reach. System documentation is generic, but the video controller and monitor have more detailed manuals.

Service and support staff answered our questions accurately, and tech support is toll free and open around the clock—weekends too. A two-year warranty caps it all off. This good support, plus MicroFlex's respectable performance and a very low price, earned this PC the sixth spot overall—not quite a Best Buy, but awfully close.

MicroNiche Information Systems M466

VITAL STATISTICS

Direct price: $2709
PROS: Nice price, solid across the-board performance
CONS: Small hard drive, insufficient documentation
Contact: Micro Niche Information Systems, 800/733-9188, 408/730-9188
Reader service no. 672

At first glance, the MicroNiche M466 appears to be the epitome of the clone knockoff: unimaginative name, nondescript case, scanty manual. Even a closer look doesn't

Polywell Poly 486-66V

VITAL STATISTICS

Direct price: $2995
PROS: Excellent performance, great expandability
CONS: No system board documentation
Contact: Polywell Computers, 415/583-7222, 800/999-1278
Reader service no. 675

This tower of power earns a Best Buy because it has it all when it comes to number crunching: a 66-MHz DX2 processor, 8MB of RAM, 256K of secondary cache, VESA local bus controllers for hard disk and video, and 4MB of disk cache on the disk controller. It's also highly expandable, with three free externally accessible and two free internal drive bays and five free 8/16-bit expansion slots.

The good news doesn't stop there. Although it performed unremarkably on our *Windows* apps, the Poly 486-66V aced the BAPCo tests, scoring first in the spreadsheet test. The Polywell didn't do so well on graphically based tests, but it turned in a solid fourth-place finish (14 percent above average) for overall performance.

Polywell's service and support scored well, with a good showing on accuracy and responsiveness and a year of free on-site service, a toll-free line, Saturday tech support, and a two-day turnaround guarantee. Only the internal design and documentation get mixed reviews. The jumpers and SIMMs are easily accessible, but the CPU is far from a cooling fan, and cables are a bit tangled. In all other respects, however, the Poly 486-66V is a splendid performer, earning the number two overall value in this roundup. Unless you don't have room for a full-size tower PC, we recommend you put Polywell's Best Buy offering near the top of your shopping list.

Quill Qtech 486DX-50

VITAL STATISTICS

Direct price: $2999
PROS: Good expandability for a compact
CONS: Comparatively poor performance, especially in BAPCo tests
Contact: Quill Computer Products, 708/634-6650
Reader service no. 676

The Qtech promised to stick out above the rest, with a high-performance EISA bus, 8MB of system memory, and 256K of secondary cache. Its performance was duller than expected, though, likely due to its 50-MHz 486DX processor. Overall performance was disappointing, nearly 16 percent behind the average system. The Qtech might have helped itself considerably by adding local bus video and disk, which operate faster on a DX-50 than a DX-66.

Other features redeem it to an extent. Despite being a compact, the Qtech has five externally accessible drive bays and eight 32-bit EISA slots. Its 202MB SCSI hard drive is buttressed by 2MB of disk cache. The Quill is backed up with free on-site service and a two-day turnaround guarantee on repairs, and we found hold times to be minimal. Even so, sharp buyers should consider other reviewed machines, which offer better overall value for the money.

Silicon Valley 486DXC2/66 Turbo

VITAL STATISTICS

Street price: $2479
PROS: Low price
CONS: No secondary cache RAM, no direct customer support
Contact: Silicon Valley Computer, 415/967-1100, 415/967-0770 (fax)
Reader service no. 678

Silicon Valley managed to send us a DX2-66 with 8MB of RAM for $500 less than our limit in this review, achieved in part by not including any of its potential 512K secondary cache. That's probably why it gets lost amid the faster performers. This system came in about 5 percent slower than average, due to its average or worse scores in every category, including spreadsheets.

This minitower system has average expandability, but three of its slots are partially obstructed by the drive cage. The 203MB Western Digital hard drive is typical in size. The Paradise Accelerator for *Windows* video board is also average, as is the 14-inch monitor.

Silicon Valley no longer has on-site service, and the week-long turnaround guarantee doesn't help. Furthermore, Silicon Valley doesn't provide direct support, nor does it help dealers very much. The result is a dead last score for service and support. With poor service and support and an average showing in everything except price, we can't recommend this machine. If you want a cheap number cruncher, look at one of the less expensive Best Buys instead.

Swan 486DX2-66V

VITAL STATISTICS

Direct price: $3073
PROS: Above average performance, good service and support
CONS: Limited expandability
Contact: Swan Technologies, 814/234-2236, 800/468-9044
Reader service no. 679

The Swan PC isn't the most aggressive bird on the pond, but by scoring more than 3.5 percent above average in overall performance, it holds its own in this month's pecking order. The 66-MHz DX2

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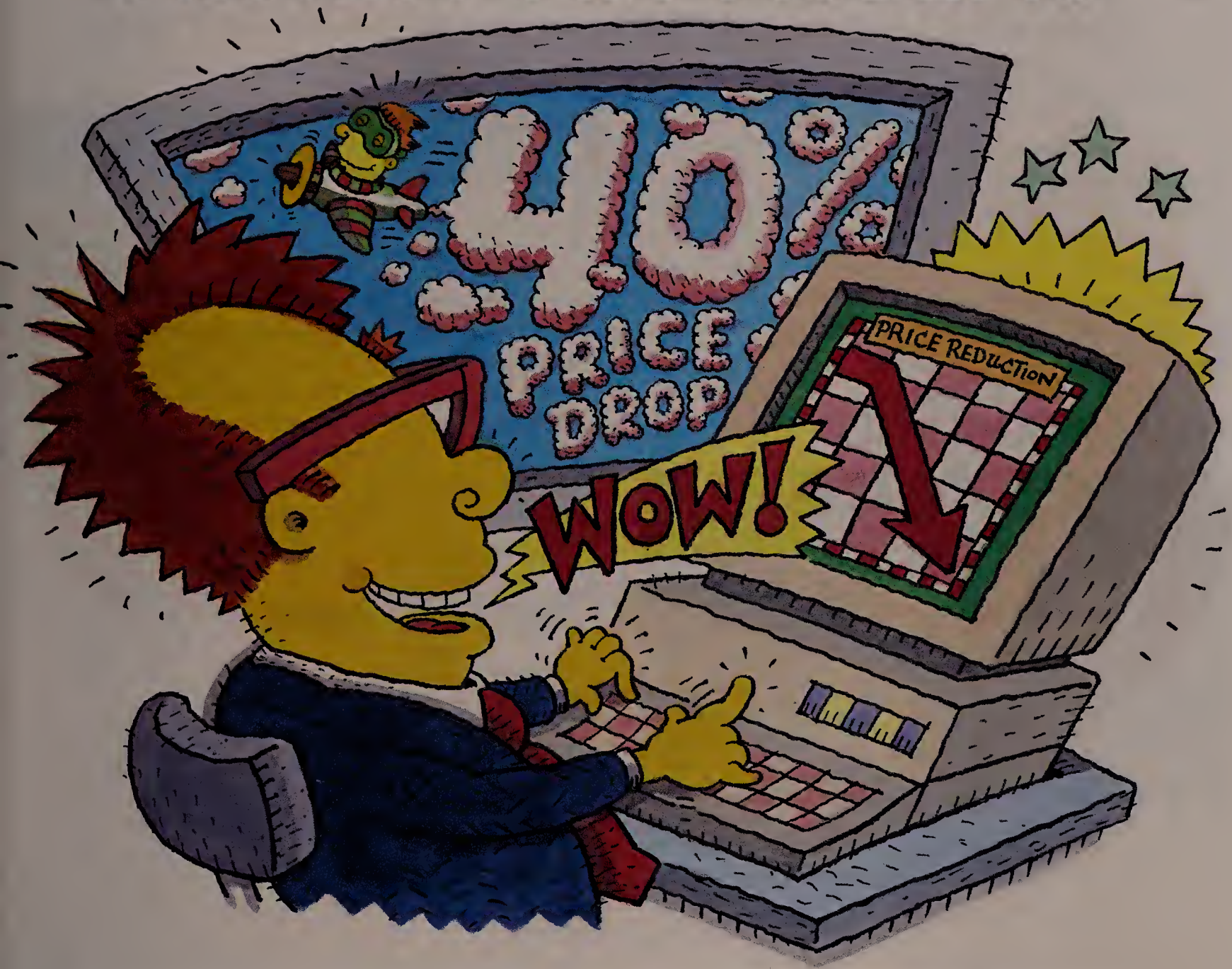

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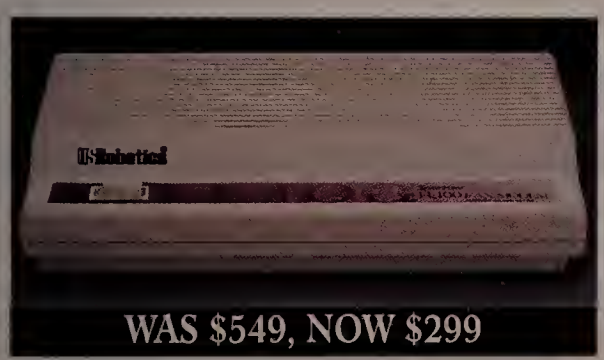

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Circle 154 on reader service card

CPU, 8MB of RAM, and 256K of secondary cache undoubtedly helped this system place over 8.5 percent above average in our *Excel* test.

Swan makes its own nicely designed motherboards and this time included a 234MB Quantum hard drive. The Diamond Speedstar video board might once have been outstanding but is merely ordinary in this company; nevertheless, it helped the Swan achieve decent all-around performance scores. The keyboard is clattery but has good tactile feedback, and the documentation is very good, with plenty of helpful diagrams.

The system's biggest drawback is limited expandability, with only two 5¼-inch drive bays left free, despite the use of a combo floppy drive. There are also only four free slots.

Swan provides decent service and support, highlighted by a two-year warranty with tech support open 12 hours a day, full weekend support, and free on-site service. Although answers to our questions weren't perfect, they were on a par with most other vendors'. Overall, though this Swan doesn't manage to rise above the crowd, it's a solid performer. If you don't see a need to upgrade, this system might be worth a look.

Touche 5550T/486-66 ISA

VITAL STATISTICS

Direct price: $3198
PROS: Top-notch expandability
CONS: Subpar performance, poor documentation, low on RAM
Contact: Touche Micro Technologies, 708/810-1010, 708/810-9490 (fax)
Reader service no. 680

If tons of expandability is your top priority, you may want to tap this monster from Touche, but it's not the first machine to turn to for truly tough number-crunching tasks.

The 5550T/486-66 ISA comes with six externally accessible 5¼-inch drive bays and five internal 3½-inch bays, as well as seven 8/16-bit slots and one 8-bit slot, and that includes an integrated disk connecter. Great—for a server.

But number-juggling is the name of the game here, and this is where the 5550T lets the ball drop. Even though it sports a fast 66-MHz processor, the PC's skimpy 4MB of RAM and 64K of secondary cache contribute to its low performance scores—it ranks in the bottom five in this review (over 14.5 percent slower than the average). It finished a dismal 24th out of 25 on the *Excel* tests (37 percent slower than the average), though it fared better (just shy of average) on the BAPCo spreadsheet tests. Rankings for the *Windows* applications were consistently low, but BAPCo results were better, though still under par.

In most other respects, the 5550T is unremarkable. The SIMMs on the motherboard are readily accessible, and the CPU has a miniature cooling fan attached to it, but some of the DIP switches for configuring the system are hard to get at and the CPU is buried under a drive cage. The keyboard is comfortable but a little noisy. Documentation is particularly bad, consisting of a skimpy quick install reference guide with barely legible diagrams and a bundle of printouts of the PC's BIOS information. The Touche does have a 15-inch monitor though.

Service and support ended up in the middle of the pack—the company's tech support staff responded to our queries quickly but with poor accuracy. In addition, Touche exceeded our price limit by $198. If expandability's your main requirement, start with the Touche 5550T. Otherwise you can find smaller, better-performing machines at more competitive prices.

Late List Prices

As if to underscore our point that computing power has never been more affordable, prices for many of the systems in this review dropped dramatically in the two months between our initial pricing research and another quick round of calls we made before shipping this review to the printer. The list price for the Quill dropped by $500, the Silicon Valley by $434, and the CUI by $350. The already low-priced Netis went even lower, from $1990 to $1855—it remains the cheapest system here. With these price changes, the system from Diamond becomes an even more attractive buy, as does the Ariel.

Prices Drop, Systems Move Up

	List price as of March 1993	Price drop from January 1993
Acma 486DX2/66 Workstation	$2795	none
ALR BusinessVEISA 4/66d Model 170DW	$3543	none
Ariel 486DX2-66VLB	$2795	$200
AST Bravo 4/66d Model 123B	$3205	none
Austin 466DX2 VESA-LB	$2995	$104
Axik Ace Cache 486V	$2798	$100
Blackship BLK 486/50E	$2795	none
CAF Gold 6D2	$2795	$89
Compaq Deskpro 4/66i Model 120/w	$3677	none
CompuAdd 466DX2 Desktop Power	$2968	$48
CompuAdd Express 466DX2	$2695	$200
CUI Advantage 486-66DX2	$2999	$350
DECpc 466d2 LP	$3009	$40
Diamond DT 486VL	$2575	$300
Gateway 2000 4DX2-66V	$2995	$125
Insight i486DX-50	$2999	none
Micro Express ME MicroFlex 486DX2-66	$1999	$151
MicroNiche Information Systems M466	$2575	$134
NEC Image 466	$3109	none
Netis 486DX2-66 Local Bus System	$1855	$135
Polywell Poly 486-66V	$2750	$245
Quill Qtech 486DX-50	$2499	$500
Silicon Valley 486DXC2/66 Turbo	$2175	$434
Swan 486DX2-66V	$3073	none
Touche 5550T/486-66 ISA	$3198	none

n the world of music, nobody knows the score like Yamaha. And now, so can you. With Yamaha's Hello!Music!

You don't have to be Stravinsky. You don't even have to be Einstein. Everything you need to add the drama, the power, the emotion of music to any multimedia project is right here.

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From strings to woodwinds to grunge guitar.

Inside the Hello!Music! CBX-T3 Tone Generator (that slim little unit to the right of the CPU) are 192 sampled instrumental sounds which conform to the General MIDI standard. All yours with a few clicks of the keyboard, or a few clicks of the mouse.

What's more here's an audio input terminal to let you bring in sound from any source, be it CD, cassette player, radio or television. Plus all the software you need to mix everything together, for output at the same level of quality as CD audio.

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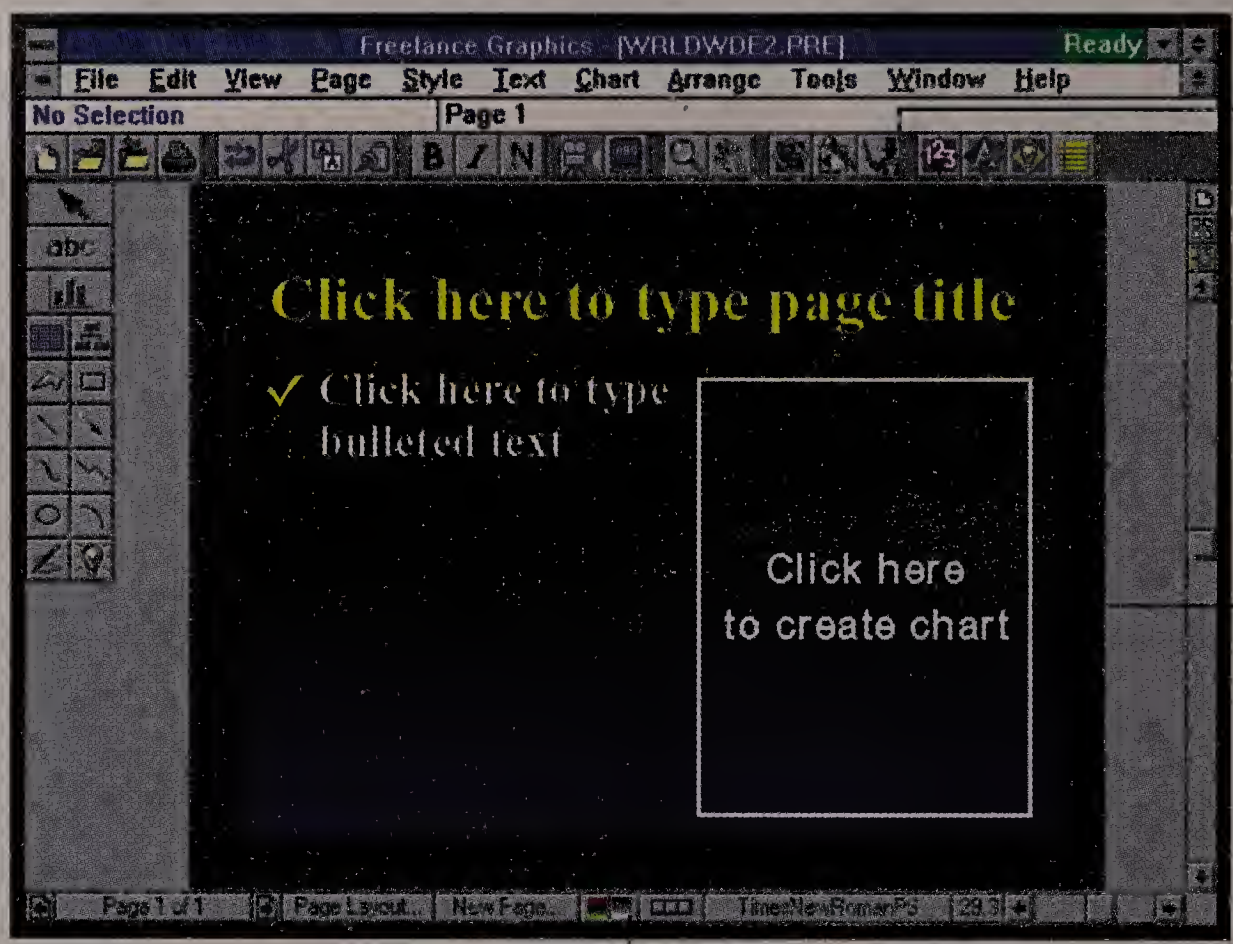
Now Yamaha brings everything we know about music to a whole new keyboard.

New Freelance Graphics 2
(Especially the decision



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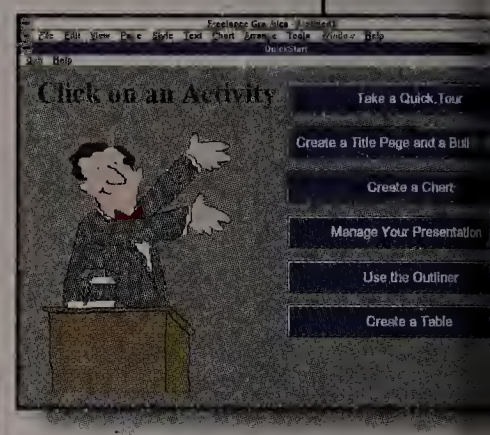
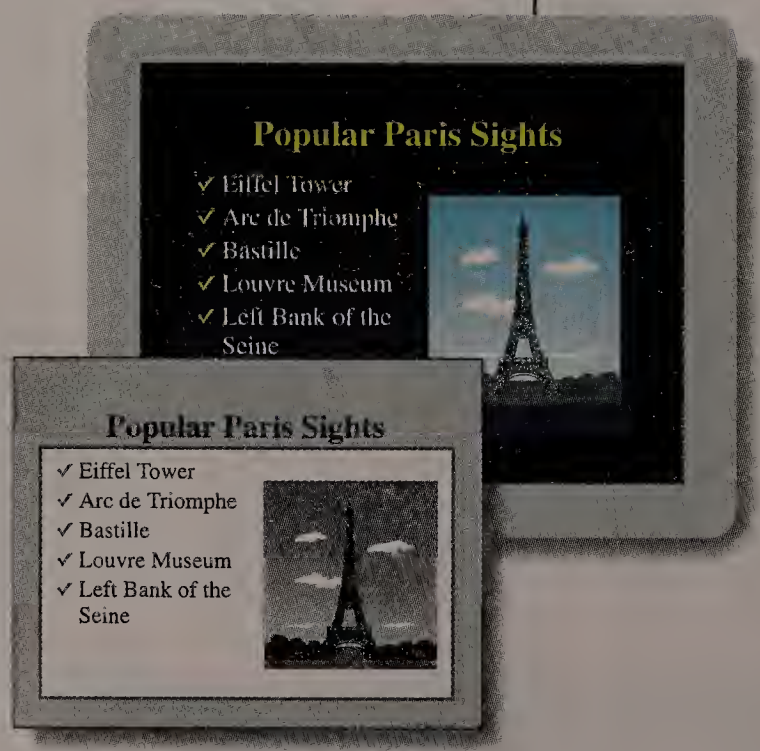
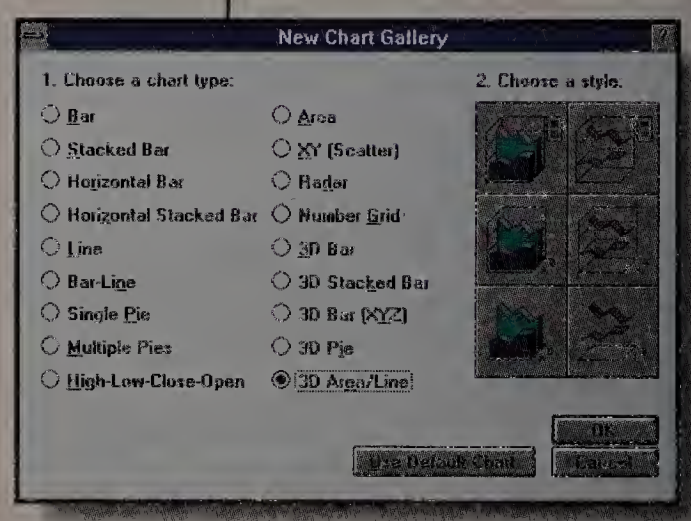


Just click to view the animated QuickStart tutorial. It walks yo through your first presentation in under 30 minutes.



Just click to instantly see your presentation in color or B/W. It's automatically optimized for printing both.



Just click to browse through a gallery of 108 ready-to-go chart styles including new 3-D line, 3-D area and radar selections.

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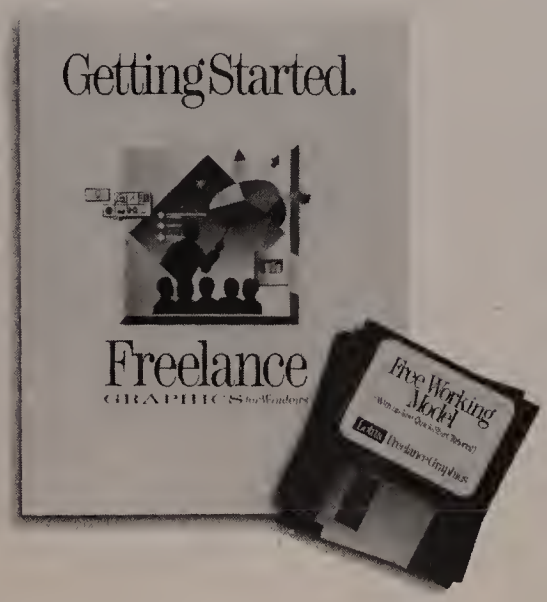
y disk format is: ☐ 3½" ☐ 5¼" Do you currently own a graphics package? ☐ Yes ☐ No



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Luring new business.

Charles McGuire, food production consultant in Boise, uses ScanMan 256 with OCR to put text and images into a professional-looking newsletter on fish farming. Now he's reeling in clients.

Stuck for time.

If you don't want to spend countless hours trying to copy an image freehand, follow the lead of Computot, a Massachusetts company that uses ScanMan Color to scan images into a computer-aided tattoo design system. (No kidding.)

The easy way.

If you find yourself in need of some quick cash, the U.S. Treasury Department would like you to know this is quite illegal.

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Any one of our hand-held scanners can do anything a flatbed can do and more, at about a third of the price. See your local dealer, or **CALL 1-800-732-3064.**

Had the drive, but not the green.

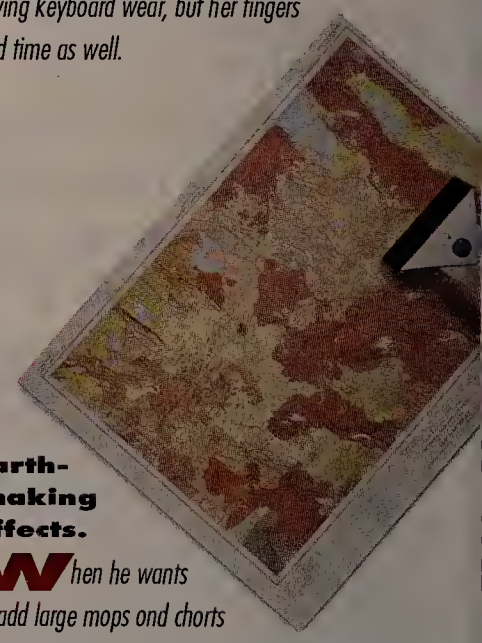
Chris Maxwell of Idaho didn't have the cash to launch his magazine, "Inland Empire Golfer", until ScanMan Color gave him high-quality color images without the hazards of costly service bureaus.

Don't lose your punch.

Researcher Debbie McKay retyped so many documents, she wore out three keyboards. So she bought ScanMan with OCR. Now she's not only saving keyboard wear, but her fingers and time as well.

Make a big impression.

Peakdesign of Oakland uses Logitech's ScanMan to create customized icons for user-friendly interfaces on proprietary systems. The end product looks tailor made, and the clients look impressed.



Earth-shaking effects.

When he wants to add large maps and charts to the textbook he's writing, California geophysicist Rick Blakely uses Logitech's ScanMan with AutoStitch to lace together individual scans. It makes his data more moving.

ScanMan™ Color: 16.8 million colors and FastTouch™ Color software.
ScanMan 256: FastTouch, 256 grayscale, and Catchword Pro™ OCR.
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	Excel 4.0	Freelance for Windows 1.0	Word for Windows 2.0	Paradox 3.5 in DOS window	BAPCo SYSmark92
CAF Gold 6D2	82	142	102	109	180
NEC Image 466*	81	112	99	128	163
Axik Ace Cache 486V*	96	123	111	139	171
Polywell Poly 486-66V*	100	135	134	144	185
ALR BusinessVEISA 4/66d (170DW)	87	145	104	135	156
Gateway 2000 4DX2-66V	91	110	106	141	146
Acma 486DX2/66 Workstation	99	177	111	125	163
AST Bravo 4/66d Model 123B	103	133	138	125	149
Compaq Deskpro 4/66i Model 120/w	84	143	109	129	125
Swan 486DX2-66V	98	169	116	143	141
MicroNiche Information Systems M466*	102	155	142	134	139
Diamond DT 486DVL*[1]	87	151	113	153	127
CUI Advantage 486-66DX2	116	176	149	158	165
Micro Express ME MicroFlex 486DX2-66	105	195	112	164	149
Insight I486-50[1]	114	151	126	135	126
Silicon Valley 486DXC2/66 Turbo	107	159	123	139	130
Netis 486DX2-66 Local Bus System	103	162	132	155	121
Ariel 486DX2-66VLB	128	107	130	185	141
Austin 466DX2 VESA-LB	120	160	121	171	125
CompuAdd Express 466DX2	119	141	158	179	126
DECpc 466d2 LP	130	162	170	145	127
Touche 5550T/486-66 ISA	147	173	160	172	137
Quill Qtech 486DX-50[1]	125	153	155	179	119
Blackship BLK 486/50E[1]	99	191	120	164	105
CompuAdd 466DX2 Desktop Power	160	154	205	187	134

***Best Buy**

[1]System uses an Intel DX-50 CPU; other systems use an Intel DX2-66.

All test results are measured in seconds (lower is better) except the BAPCo SYSmark92 results, which are measured in scripts executed per hour (higher is better). Systems are listed in order of overall performance.

Methodology

All tests were run using systems configured as specified in the Features Comparison table. If we had to install *Windows*, we performed the default installation. We configured *Windows* with a Hewlett-Packard LaserJet III as the default printer, disabled Print Manager, and attached a null printer to LPT1. Using vendor-supplied video drivers when possible, we set the resolution to 800 by 600 pixels with 16 colors.

Excel 4.0

We perform several data extracts; build and format a financial statement and print it; and open a mortgage analysis, scroll, move blocks, change the interest rate, print-preview the statement, and save it.

Freelance for Windows 1.0

We load a single-page starter file containing a United States map with each state a separate object. Then we build a six-page presentation using charts and preview it five times with different effects. Finally, we save the presentation to disk.

Word for Windows 2.0

We use the spelling checker and scroll through a 27-page document; create, format, print, and save a single-page business letter; and open a business proposal, add a paragraph, and preview and print the proposal.

Paradox 3.5 in DOS window

Running the program in a DOS window, we perform a variety of data entry, record searching, and updating tasks. Then we generate reports using a simple customer list.

BAPCo SYSmark 92

We run a scripting program that loads common database, desktop publishing, presentation graphics, software development, spreadsheet, and word processing applications and executes a variety of typical tasks with each. The following software packages are used: *Aldus PageMaker 4.0, dBASE IV 1.1, Harvard Graphics 3.0, 1-2-3 3.1, Microsoft C 6.0, Microsoft Excel 3.0, Microsoft Word for Windows 2.0, Paradox 3.5, Quattro Pro 3.0,* and *WordPerfect 5.1.*

All data based on tests designed and conducted by the PC World Test Center with the exception of BAPCo SYSmark92, an industry standard test designed by the Business Application Performance Corporation. Testing performed by PC World performance analysts Ulrike Diehlman and Susan Silvius. All rights reserved.

FEATURES COMPARISON

Fastest Number Crunchers: Tricked Out for Top Speed

● Yes
○ No
n/a = not applicable/available

	Acma 486DX2/66 Workstation	ALR Business VEISA 4/66d Model 170DW	Ariel 486DX2-66VLB	AST Bravo 4/66d Model 123B	Austin 466DX2 VESA-LB	BEST BUY Axik Ace Cache 486V	Blackship BLK 486/50E	CAF Gold 6D2	Compaq DeskPro 4/66l Model 120/w	CompuAdd 466DX2 Desktop Power
Standard features										
Direct/street price 1/4/93[1]	$2795	$3543	$2995[2]	$3017	$3099	$2898	$2795	$2884	$3120	$3016
Installed CPU	i486DX2-66	i486DX2-66	i486DX2-66	i486DX2-66	i486DX2-66	i486DX2-66	i486DX-50	i486DX2-66	i486DX2-66	i486DX2-66
Bus	ISA	EISA	ISA	ISA	ISA	ISA	EISA	ISA	ISA	ISA
Motherboard	Acma	ALR	Micronics	AST	Austin	Axik	AMI	CAF	Compaq	CompuAdd
Installed RAM (MB)	16	8	4	8	4	8	16	8	8	8
Hard disk	Conner CP30204	Seagate ST3283A	Maxtor 7213AT	Quantum ProDrive LPS	Western Digital Caviar 2340	Quantum ProDrive LPS	Maxtor 7213AT	Maxtor 7213AT	Quantum ProDrive LPS	Western Digital Caviar 2120
Size (MB)	202	234	202	122	325	234	202	202	122	119
Drive adapter	Promise SuperIDE DC99M	integrated IDE	integrated local bus IDE	integrated IDE	IDE card	Promise SuperIDE	IDE card	SuperIDE	integrated IDE	integrated IDE
Cache size, if caching controller (MB)	2	n/a	n/a	n/a	n/a	1	n/a	8.5	n/a	n/a
Floppy drives: 1.2MB/1.44MB/combination	0/0/1	0/1/0	1/1/0	1/1/0	1/1/0	1/1/0	1/1/0	1/1/0	1/1/0	0/1/0
Graphics controller	NDI Volante Warp 10	integrated WD 90C31	NDI Volante Warp 10 LB	integrated Cirrus Logic GD 5422	Eagle Mountain Systems	OEM w/ATI Mach 32	Orchid Fahrenheit 1280	Western Digital OEM	integrated Compaq Qvision	CompuAdd Hi-Rez
Monitor	Seiko Instruments CM1450C	ALR TE1420	NEC JC1533	AST CM41	Austin	ViewSonic 6E	KFC	Royal CN-147C	Compaq 1024	CompuAdd 51070
Diagonal size of viewable area (inches)	14	14	15	14	14	14	14	14	14	14
Expandability										
External memory cache: installed/maximum (K)	256/256	256/256	256/256	256/256	128/256	256/256	128/128	256/256	64/64	256/256
Maximum RAM (MB)	64	52	64	64	64	32	64	32	32	64
Free 32-/16-/8-bit slots	0/5/0	7/0/0	1/6/0	0/4/0	0/4/2	0/3/0	5/0/1	0/5/0	0/3/0	0/6/0
Externally accessible 3½-inch/5¼-inch drive bays	0/3	1/2	0/4	0/2	0/3	2/3	0/4	2/2	1/1	2/3
Internal 3½-inch/5¼-inch drive bays	1/1	3/0	0/2	2/0	2/0	3/0	2/2	2/0	1/0	2/0
238-pin CPU upgrade socket	○	○	○	○	●	○	○	○	○	○
Design and construction										
Case style	minitower	compact	minitower	compact	desktop	minitower	tower	compact	compact	compact
Ports: parallel/serial/mouse	1/2/0	1/2/1	1/2/0	1/2/1	1/2/0	1/2/1	1/2/0	1/2/0	1/2/1	1/2/0
SCSI/game/other	0/1/0	0/0/0	0/0/0	0/0/1[6]	0/0/0	0/1/1	0/1/0	0/1/0	0/0/1[7]	0/0/0
Service and support										
Warranty (months)	12	12	12	12	12	12	12	12	36	12
On-site service price for first year	$45	$9.95	$50	free	free	free	free	n/a	free	free
Turnaround policy (days)	4	3	2	7	3	2	2	3	2	3
Toll-free central support	●	●	●	●	●	●	●	○	●	●
Daily support (hours)	11	11	11	14	24	9.5	9	8.5	24	24
Weekend support	●	●	●	●	●	●	○	○	●	●
BBS	●[11]	●[11]	●[11]	●[11]	●	●[11]	●	○	●	●
Fax	●	●	●	●	●	●	●	●	●	●
Vendor-to-dealer support										
Dedicated support staff required for dealers	n/a	n/a	n/a	○	●	n/a	n/a	○	○	○
Dealer support staff training required	n/a	n/a	n/a	○	●	n/a	n/a	○	○	○
Parts inventory required	n/a	n/a	n/a	●	○	n/a	n/a	○	○	○

[1] All systems include super VGA and color monitor, keyboard, mouse, DOS 5.0, and Windows 3.1. Price is either direct or a street price based on calls to multiple dealers.

[2] Includes your choice of Borland C++, Quattro Pro, or Paradox (DOS or Windows version).

[3] Includes your choice of LotusWrite for Windows, LotusWorks, Lotus Organizer, or 1-2-3 for Home.

CompuAdd Express	CUI Advantage 486-66DX2	DECpc 466d2 LP (BEST BUY)	Diamond DT 486VL	Gateway 2000 4DX2-66V	Insight i486DX-50	MicroFlex 486DX2-66	Micro Express ME Systems M466 (BEST BUY)	MicroNiche Information (BEST BUY)	NEC Image 466	Netis 486DX2-66 Local Bus System	Poly 486-66V (BEST BUY)	Polywell 486DX-50	Qtech Quill Turbo	Silicon Valley 486DXC2/66	Swan 486DX2-66V	Touche 5550T/486-66 ISA
$2895[3]	$3441	$3049	$2875	$3120[4]	$2999[5]	$2150	$2709	$3109	$1990	$2995	$2999	$2479	$3073	$3198
i486DX2-66	i486DX2-66	i486DX2-66	i486DX-50	i486DX2-66	i486DX-50	i486DX2-66	i486DX2-66	i486DX2-66	i486DX2-66	i486DX2-66	i486DX-50	i486DX2-66	i486DX2-66	i486DX2-66
ISA	ISA	ISA	ISA	ISA	ISA	ISA	ISA	ISA	ISA	ISA	EISA	ISA	ISA	ISA
CompuAdd	CUI	DEC	AIR	Micronics	Aten	Forex	Micronics	NEC	OEM	Orchid	TMC	SVC	Swan	AMI
16	8	8	8	8	8	4	16	8	8	8	8	8	8	4
Conner 30204F	Quantum ProDrive LPS	Quantum OEM	Maxtor 7213SR	Western Digital Caviar 2340	Fujitsu FJ2624AB	Western Digital Caviar 2200	Quantum ProDrive ELS	Western Digital WDAC 1170	Maxtor 7213AT	Maxtor 7213AT	Maxtor 7213SR	Western Digital Caviar 2200	Quantum ProDrive LPS	Quantum ProDrive LPS
202	234	234	202	325	488	202	122	170	202	202	202	202	234	234
integrated IDE	UltraStor 15C IDE	integrated IDE	SCSI2V VESA Bus MasterSCSI-2	integrated IDE	UltraStor 15C IDE	Super IDE	IDE card	integrated IDE	Super IDE DLU 270	DataCare VL-BUS IDE	Intellistor EISC960 SCSI	SVC ADP702 IDE	IDE card	integrated IDE
n/a	4	n/a	n/a	n/a	2	1	n/a	n/a	n/a	4	2	n/a	n/a	n/a
0/0/1	1/1/0	0/1/0	1/1/0	1/1/0	1/1/0	1/1/0	1/1/0	0/1/0	1/1/0	1/1/0	1/1/0	0/0/1	0/0/1	1/1/0
integrated Tseng ET4000/AX	Hicolor Turbo F/X	integrated S3 924	AVIEW2V SVGA	ATI Ultra Pro LB	ATI UltraCAD Mach 32	Aview 2/2E/2L SVGA	Orchid ProDesigner II	integrated Tseng ET4000/W32	OEM "Enhanced VGA"	Orchid Fahrenheit VA/VLB	SuperVGA by Boca	Paradise Accelerator for Windows	Diamond Speedstar 24X	NDI Volante Warp 10
CompuAdd	Goldstar	Digital PC7XV-DA	CTX CVP-5468NI	Gateway 2000 CrystalScan 1572FS	MAG MX15F	Micro Express FM 360	CTX CVP-5468NI	NEC MultiSync 3FGx	View Magic	Micro Scan SM5515	Tatung CMS-14SBE	Eye-Q CM6P	Swan SW592	NEC 4FG
14	14	14	14	15	15	14	14	15	14	14	14	14	14	15
128/128	256/256	256/256	256/256	64/256	128/256	256/256	256/256	256/256	256/256	256/256	256/256	0/512	256/256	64/256
32	64	64	64	64	128	32	64	64	32	32	128	64	32	32
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1/0	0/4	2/0	2/0	0/2	0/0	0/1	0/0	2/0	1/0	3/0	0/0	1/0	0/1	5/0
○	○	○	○	○	○	○	○	●	○	○	○	○	○	○
compact	tower	compact	med. tower	desktop	tower	minitower	compact	compact	compact	med. tower	compact	minitower	compact	tower
1/2/0	1/2/0	1/2/1	1/2/0	1/2/0	1/2/1	1/2/0	1/2/0	1/1/1	1/2/0	1/2/0	1/2/0	1/2/0	1/2/0	1/2/0
0/0/0	0/1/0	0/0/0	1/0/0	0/0/0	0/0/0	0/1/0	1/1/0	0/0/1[8]	0/1/0	0/1/0	1/0/0	0/1/0	0/0/0	0/0/0
12	12	12	15[9]	12	12	24	12	12	12	12[10]	12	12	24	24
free	$140	free	$75	free	n/a	$50	$45	free	$100	$75	free	n/a	free	$29
3	none	none	2	none	none	2	1	none	2	2	2	7	none	1
●	●	●	●	●	●	●	●	●	○	●	○	○	●	●
10	9	11.5	9	18	12	24	10	12	10	9	9	n/a	12	8
○	○	○	○	●	●	●	○	○	●	●	○	n/a	●	○
●	●	○	○	●[11]	○	○	○	●	●[11]	○[11]	○	n/a	●	○
●	○	●	○	●	●	●	●	●	●	●	●	n/a	●	●
n/a	○	n/a	n/a	n/a	n/a	n/a	○	○	○	n/a	n/a	○	n/a	n/a
n/a	○	n/a	n/a	n/a	n/a	n/a	○	○	○	n/a	n/a	○	n/a	n/a
n/a	○	n/a	n/a	n/a	n/a	n/a	○	●	○	n/a	n/a	○	n/a	n/a

[4] Includes Central Point Anti-Virus, Central Point Backup, and your choice of one Microsoft application.

[5] Includes Stac Electronics Stacker.

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[7] Audio.

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nter for so little.

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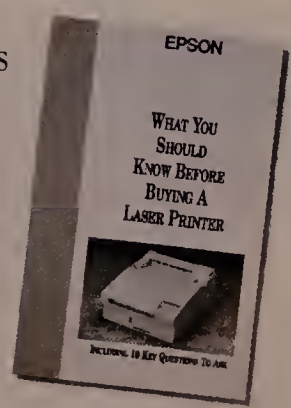

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Software is *supposed* to make our lives easier. But today's mainstream applications give you so many ways to accomplish the same thing, you may end up taking the long road home when the shortcut is just a keystroke or mouse click away.

To identify the shortcuts, we asked 16 software gurus, book authors, support technicians, consultants, and *PC World* contributing editors to let us in on their secrets for the quickest, most efficient ways to operate inside their favorite applications. You'll find hot tips for using best-selling word processors (*Ami Pro 3.0, WordPerfect 5.1,*

Not Harder

nesavers for 16 best-selling DOS and *Windows* applications.

WordPerfect 5.1 for Windows, *Microsoft Word 5.0* and *5.5*, and *Word for Windows 2.0*); spreadsheet programs (*1-2-3* for DOS and *Windows*, *Quattro Pro* for DOS, and *Excel 4.0*); databases (*dBASE IV* and *Paradox*); draw, presentation, and desktop publishing packages (*CorelDraw 3.0*, *Harvard Graphics 3.0*, and *PageMaker 4.0*); and even the enormously popular accounting program *Quicken 6.0*. Whether you use just one or several of these packages, you'll find tips that will make you so much more productive, you may be able to leave work an hour early.

16 BEST-SELLERS

Ami Pro 3.0	pg. 170
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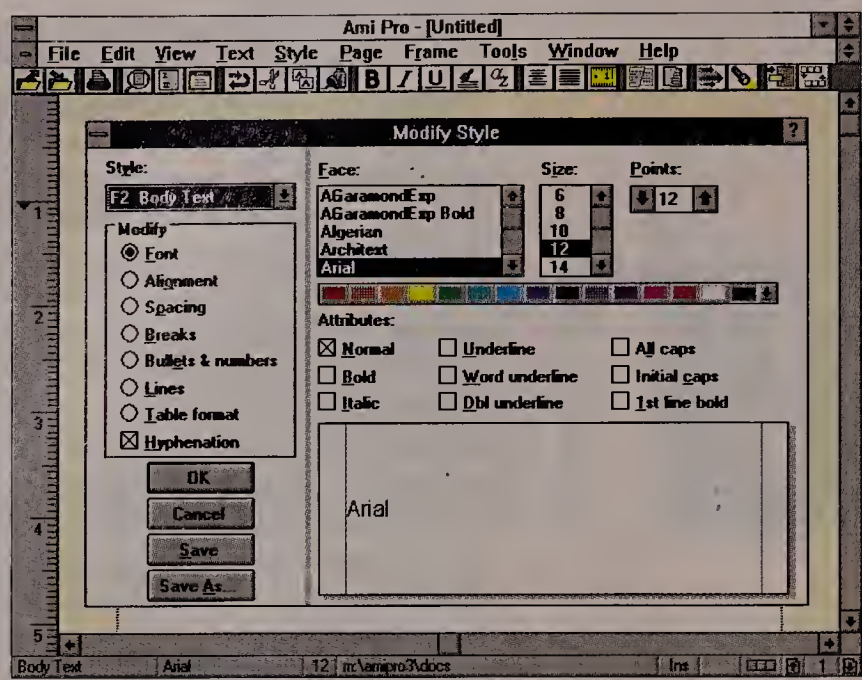
TOMER OIBLINSKI



SAVE TIME IN AMI PRO by setting up customized style sheets for common documents such as letters and memos.

WORD PROCESSORS

Working Smart in Ami Pro 3.0

Working in Style

In the old days of DOS word processors, I did a lot of manual formatting. Now I create specialized templates for common documents, so when I need a bulleted list or an indented paragraph, I just press a function key or pick a style from a list. Here's how you can set up customized style sheets.

Start *Ami Pro*, which loads the _DEFAULT.STY sheet and selects *Style•Modify Style*. From the Style list, choose *Body Text* for the bulk of your text. Specify the font, size, alignment, and other options in the dialog box, then select *Save*. Modify the other existing styles in the same way. To create a new style name, such as Indented Text, choose *Body Text*, select *Save As*, type the new name, then select *OK*. Select the *Alignment* option and set your indents, then make any other changes you need and select *Save* again. Create or alter any other styles you need, then select *OK*. To alter page layout options for the default template, select *Page•Modify Page Layout* and set up margins, columns, tabs, and so on.

To make your changes permanent, select *Style•Save as a Style Sheet*. In the dialog box, type _DEFAULT.STY in the File Name text box if it's not already there. Enter a description in the Description text box, then select *OK* and confirm overwriting the file. For other types of documents, follow the same steps, but enter a different file name when you save the style sheet.

Stylish Templates

Style sheets aren't limited to formatting; they can also contain boilerplate text, frames, and graphical images. I've created a letterhead, with my company logo, as part of a LETTER.STY style sheet. Type in a signature block and add an automatically updated date by selecting *Edit•Insert•Date•Time*. Just add the standard elements before saving your document as a style sheet. Then, in the Save as a Style Sheet dialog box, check the With Contents box before selecting *OK*.

Paragraph Pranks

To attach a template to a new document, select *File•New*, choose that template from the list, and select *OK*. You'll save time if you type your text in the default Body Text style. To reformat, position the cursor in the paragraph, then click the *Style* button on the left side of the status bar at the bottom of the screen to display a list. It's even faster to press the function key shown to the left of each style in the list. To change the function keys, select *Style•Style Management* and make your changes in the dialog box.

For even faster paragraph formatting, assign a style to one block of text, then select that block and press **<Ctrl>-T** or select *Text•Fast Format*. Choose *Only Paragraph Style* and select *OK*. Your mouse pointer will change to a paintbrush. To apply the same style to other paragraphs, click and drag on any part of a paragraph. When you're finished with that particular style, press **<Ctrl>-T** or select *Text•Fast Format* again to turn fast formatting off.

—George Campbell

Working Smart in Word 5.0

Quick Keystrokes

I'm neither a menu person nor a mouser. Fortunately, *Word 5.0* supports my style with some handy keystrokes, such as **<Ctrl>-<Page Up>** to get to the first line of a document, and **<Ctrl>-<Page Down>** to reach the end.

To select a paragraph, place the cursor anywhere in the paragraph and press **<F10>**. To format continuous text, press **<F6>** at the start of the text, then press **<F10>** for as many paragraphs as you want to format, or use the <Down> and <Right> cursor keys to move quickly through the document. To apply a format to an entire document, press **<Shift>-<F10>** to select all the text, then **<Alt>-XB** for bold, **<Alt>-XU** for underline, or **<Alt>-XI** for italics.

To undo character formatting, highlight the text, then press **<Alt>-X<Space>**. If the paragraph formatting is wrong but you can't figure out why, select the offending paragraphs, then press **<Alt>-XP** to strip out the character or paragraph formatting.

Default Zone

If you hate having your margins set at *Word*'s default 1.25 inches every time you start a document, don't agonize—customize! Create a style sheet by pressing **<Esc>GI**. Then **<Tab>** to Usage and press **D<Tab><F1><Enter>**. Now press **FM**. Reset the margins to your preferred default and press **<Enter>**. Press **TS** and save the style sheet as the default **NORMAL.STY**, then press **<Enter>**, and **E** to return to your document.

Zig-Zag Zap

Don't waste time printing documents to see how lines will break. Instead, press **<Esc>O**, then tab over to Show Line Breaks and set it to *Yes*. This setting will show you where a line of monospace characters will break. If you see that your text is running off the side of the screen, but you're not trying to align text, set Show Line Breaks to *No*.

—Lynn Launer

Working Smart in Word 5.5

Cure for Function Key Homesickness

Because *Word 5.5*'s drop-down menu interface is so handy, I don't have to remember so many different commands. I do have to remember, though, that the old <Alt>-*key* formatting commands from *Word 5.0* use the <Ctrl> key instead. So instead of pressing <Alt>-B for boldface, I have to press **<Ctrl>-B**.

Sometimes I get homesick for *Word 5.0*'s function key shortcuts. When this happens, I select *Utilities•Customize*, check the Use Word 5.0 Function Keys box, and select *OK*.

See It All

To see as much text as possible on the screen, select *View•Preferences*, then choose *Text*, *50 Lines*, *80 Columns*, *16 Colors* in the Display Mode list box. The Text mode speeds up the program; to see italics and boldfacing press **<Alt>-<F9>**.

The Glossary Gift

Whenever I need to store text for use in other documents, I automate the process with *Word*'s Glossary feature. Here's how: Type the text, then highlight it and select *Edit•Glossary*. In the dialog box, type an easy-to-remember abbreviation (like ADD for an address) in the Glossary Name field, then select *Define*. When you exit the program, click *Yes* to save glossary changes. When you need the text in another document, type the abbreviation, then press **<F3>** to insert it at the cursor position.

If you forget the abbreviations, select *Edit•Glossary*, find the abbreviation in the list, and select *Insert* to pop it in.

—Bronwyn Fryer

Working Smart in Word for Windows 2.0

Cunning Keyboard Tricks

Sometimes there's such a thing as too much freedom of choice. Take selecting text in *WinWord:* You can use the mouse, the keyboard, or the mouse *and* the keyboard. So what's the fastest, smartest way? Treat the mouse like the disease-bearing vermin it is and memorize the following shortcuts.

To select a single word and the space after it, place your cursor on it and press **<F8>** twice. To select a sentence and the space after it, press it three times. Pressing **<F8>** and a character highlights to the next occurrence of that character. Four presses gives you the paragraph, and five selects the whole document. (If you want to get technical, though, **<Ctrl>-<Numpad 5>** is an even faster way to select everything.)

Selected more than you wanted? **<Shift>-<F8>** backs you down one level. If you change your mind entirely, press **<Esc>** to turn off *WinWord*'s selection mode.

Take Control of Your Formats

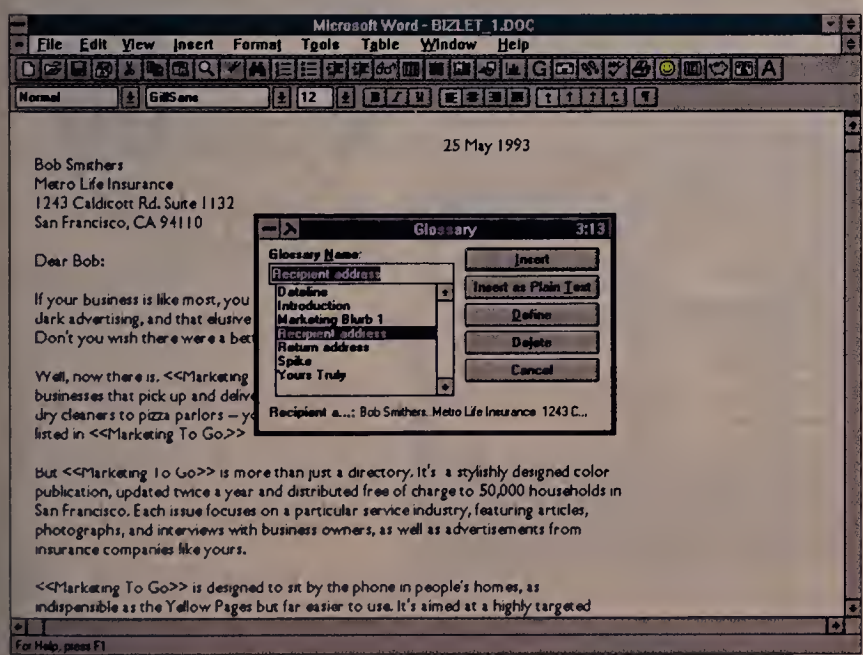
When you need to format text, take Control. **<Ctrl>-B** makes selected text boldface; **<Ctrl>-I**, italic; **<Ctrl>-U**, underlined. You can use these toggles to format selected text or to set the format for the next character as you type. Press the same key combo to toggle them off.

<Ctrl>-A toggles text entered in lowercase between uppercase or lowercase, but remember, it's only an appearance; Edit•Find and Edit•Replace won't see those characters as uppercase, and if you save the file as text only, you'll lose the appearance formatting. To actually change the case of selected text, use **<Shift>-<F3>**, which cycles selected text through lowercase, uppercase, and initial capitals.

To format paragraphs, press **<Ctrl>-1** or **<Ctrl>-2** for single and double spacing, respectively, and **<Ctrl>-E**, **<Ctrl>-L**, and **<Ctrl>-R** for centered, left-, and right-aligned text. To clear all formatting, press **<Ctrl>-<Space>**.

Quick Text Inserts

Only a dolt types the same text more than once. When you need to insert the same text over and over in your document, save it as a glossary entry. Select the text, press **<Alt>EO** to call up the Glossary dialog box, type a name for the entry (use something memorable), and press **<Enter>**. Then, whenever you need to insert the text, type the glossary name and press **<F3>**.



WORD FOR WINDOWS' GLOSSARY FEATURE saves you from having to type the same information twice.

The Mouse House

If you must mouse, here are a few pointers. Double-click on a word to select it. To select a line, place the cursor in the left margin so it changes from an I-beam to an arrow and click once; to highlight a paragraph, double-click in the left margin. **<Ctrl>**-click in text to select that sentence. To select a longer block of text, click once in the left margin at the top of the block, hold down **<Shift>**, and click once at the bottom. To highlight the whole megillah, **<Ctrl>**-click in the left margin. And to select columns, click and drag with the right mouse button.

Customizing the Tool Bar

Customize your tool bar correctly, and you may never have to pull down a menu again. Select **<Alt>OOT** to get to the Toolbar Options dialog box. Here you can assign an icon to any command or macro in *WinWord*'s arsenal and place it on the tool bar. Simply click *Commands* or *Macros* in the Show box, scroll down the list of commands or macros, click on the one you want to add, scroll through the Button list box, and pick an appropriate icon. In the Tool to Change list box, choose an icon you want to replace or choose a [space], put the new icon on an empty space on the bar. Click *Change•Close* and the new button will appear.

So which icons should you add to your tool bar? Here are five I can't live without: ViewZoom, which lets me shrink and expand my document view; DocumentStatistics, for an instant word and character count, as well as info on editing time and revisions; ControlRun, which takes me to the *Windows* Clipboard or Control Panel; ViewPage, for instant print previews; and InsertPageNumbers, for...well, you can probably figure it out.

—Dan Tynan

Working Smart in WordPerfect 5.1

Key Consciousness

WordPerfect runs fastest with function keys, which are easier to learn if you lay the program's template on your keyboard and stick the color-coded decals on the <Ctrl>, <Alt>, and <Shift> keys. I also find it easier to memorize *WordPerfect*'s commands by using the menus' mnemonic letter choices.

WordPerfect was designed around the <Home>, <End>, and cursor keys on the

numeric keypad. If you turn off Num Lock and use the numeric keypad rather than the inverted-T cursor keys, you'll save your fingers a lot of labor. Also, train yourself to use <Ctrl>-<Right> and <Ctrl>-<Left>, which move you forward and backward one word at a time, and <Gray Plus> and <Gray Minus> keys on the numeric keypad, which move you forward and backward one screen at a time.

Cursor Control

Another set of navigation shortcuts uses the <Home> key to bolster the effect of the cursor keys. The more often you hit <Home>, the more extreme the effect: **<Home><Up>** moves the cursor to the top of the screen; **<Ctrl>-<Home><Up>** to the top of the current page; **<Home><Home><Up>** to the top of the document; and **<Home><Home><Home><Up>** to the top of the document before any hidden codes. Similarly, **<Home><Left>** moves to the left of the screen; **<Home><Home><Left>** to the beginning of the line (if you're using a small font or wide paper, a line may be several screens wide); and **<Home><Home><Home><Left>** to the beginning of the line before any codes. (<Down> and <Right> use the same key combos, but it's faster to use <End> than <Home><Home><Right>.)

You can move the cursor to a specific page in a document by pressing **Go To** (**<Ctrl>-<Home>**) and entering a page number. Pressing **<Ctrl>-<Home>** twice returns you to where you last entered a major navigation command. To move around when editing, use **<Search>** (**<F2>**) to jump to exactly the right spot: Press **<Search>**, type the text that appears *before* the letter you want the cursor to land on, and press **<Search>** again.

Around the Block

When you cut a block, *WordPerfect* tells you to 'Move cursor; press Enter to retrieve'. If it makes more sense to clean up around the cut before moving elsewhere to paste, press **<F1>** (Cancel). The prompt goes away and you can edit freely. So long as you don't use the Copy or Move commands, the cut text is still in memory; to retrieve it, position the cursor and press **<Ctrl>-<F4>RB**.

For block moves, the time-honored trick in the *WordPerfect* bag is using Undo (**<F1>**). Delete the text you want to move, position the cursor where you want to paste it, and press **<F1>R** (*Undo• Restore*).

Delete Delight

To delete a single word, position the cursor anywhere on it and press **<Ctrl>-<Backspace>**; press it repeatedly to delete additional words. To delete to the end of a line, press **<Ctrl>-<End>**; continue to hold down these keys to quickly delete to the end of the current paragraph.

Quick-Change Formats

If you apply a format like Italics from the Font•Appearance menu, *WordPerfect* inserts hidden start and end codes: [ITALC] and [italc]. You don't have to go back to the menu to turn off the format when typing; the characters you type subsequently are inserted between the codes. Press **<Right>** to move past the end code.

—Robert Lauriston

Working Smart in WordPerfect 5.1 for Windows

Keyboard Cut-Ups

I believe in equal rights, so I use a mouse for some things and a keyboard for others. The mouse is great for clicking on the Button Bar or selecting text (to select a word, place the cursor on it and double-click; click three times to select a sentence, four times to select a paragraph). But memorize the following few keystrokes, and you'll be racing through your documents faster than the favorite at Churchill Downs.

To go to the beginning of a document, press **<Ctrl>-<Home>**; to get to the end, press **<Ctrl>-<End>**. Pressing **<Ctrl>-<Delete>** deletes text to the end of a line; **<Ctrl>-<Backspace>** deletes a word. Press **<Ctrl>-G<Tab><Tab><Enter>** if you want to return the cursor to the last position you moved it to using a feature such as GoTo, Replace or Home.

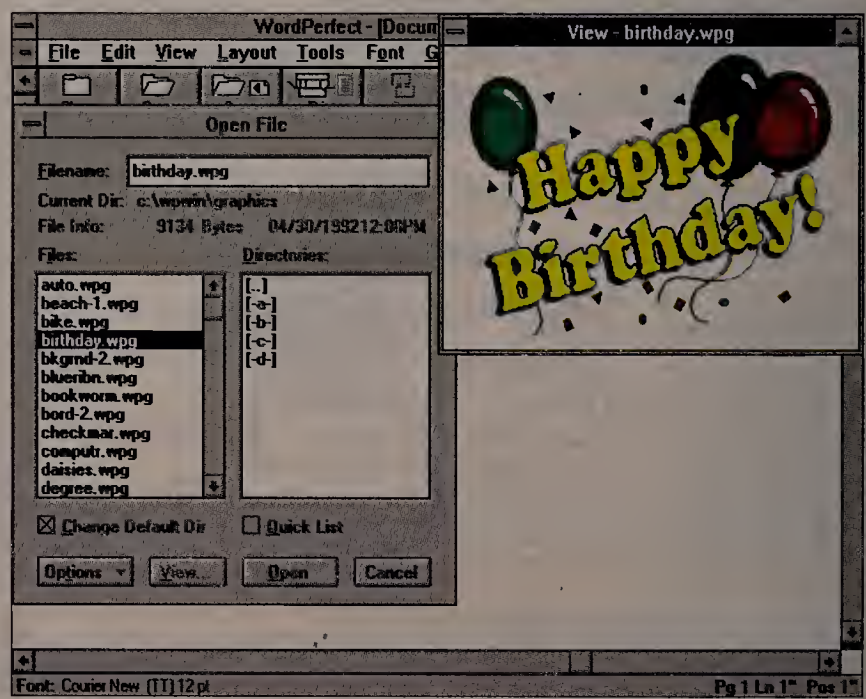
Most of us know the time-honored shortcuts, like **<Ctrl>-Z** for undo, **<Ctrl>-X** for cut, **<Ctrl>-C** for copy, and **<Ctrl>-V** for paste. Not everyone knows, though, that pressing **<Ctrl>-P** will print the document that's on screen without asking you to fill out a dialog box. Want to extend highlighting to a certain character? Just press **<F8>** and type the character. Want to turn boldface text (or some other different format) back to normal? Just select it and press **<Ctrl>-N** to return to normal text. And press **<Ctrl>-W** to access special symbols such as foreign characters and accent marks.

No More Dialog Dallying

Using a mouse to make selections in a dialog box is like shooting peas with a cannon. Instead, wend your way through dialog boxes by pressing **<Tab>** or by holding down **<Alt>** and pressing the underlined letter of the area or button you want. To open a pop-up list, move to the list button and press **<Alt>-<Down>** or **<Alt>-<Up>**. Type the underlined letter in an item's name to move directly to it. And although you can move to a check box and press **<Space>** to check or uncheck it, and you can move to a radio button list and use **<Up>** or **<Down>** to make your selection, in both cases, using **<Alt>***underlined letter* is faster.

Quick Lists

To avoid wasting time searching through file names, I always set up a Quick List of files and directories. Select *File•Open*, check the Quick List box if necessary, select *Edit•Quick List* and then add the documents and directories you use most often. (To switch between a Quick List and the regular directory list in the File Open Dialog Box, press **<Alt>-Q** to check and uncheck the Quick List box.)



WHY SEARCH THROUGH FILE NAMES in WordPerfect for Windows? Instead, set up a Quick List of files and directories you use frequently.

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A Better View

WordPerfect for Windows' Viewer window shows you what's in a file without actually opening it. Choose *File•Open*, select the file name, and then click the *View* button or press **<Alt>-V** for a sneak preview. To see what's in another file in the directory, click it or cursor to it.

Macro Magic

WordPerfect for Windows lets you use your favorite macros with the click of a button. Once you've recorded a series of commands as a macro and named it, place it on the Button Bar where you can get to it quickly: Select *View•ButtonBarSetup•Edit*, select *Assign Macro to Button*, choose the macro from the list, click *Assign* and voilà! The macro shows up on the button bar. When you're finished adding macros, click *OK*.

—Kay Yarborough Nelson

SPREADSHEETS

Working Smart in 1-2-3 release 2.x and 3.x

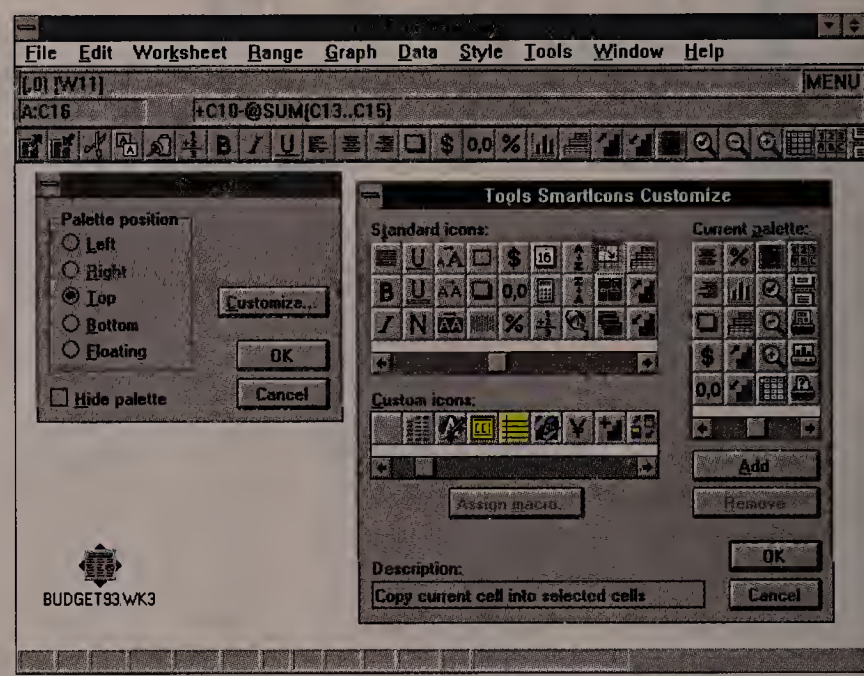
Make an End of It

If I could see all 8192 rows by 256 columns in my *1-2-3* spreadsheets, I'd be looking at a screen more than 7 yards wide and 61 yards long. With so much spreadsheet real estate at hand, it's worthwhile knowing how to get around.

I use the <End> key to jump almost anywhere in my spreadsheet with lightning speed. For example, press **<End>-<Home>**, and the cell pointer jumps to the bottom right corner of the active worksheet. (If that cell happens to be cell K50, you can be sure there are no entries or formatting in any of the cells in columns L through IV and in rows 51 through 8192.) Press **<End>-<Right>** starting on a blank cell, and the cell pointer stops at the next nonblank cell to the right of that cell. If there are no nonblank cells, it shoots all the way to column IV. (If you start on a nonblank cell, the cell pointer stops at the last nonblank cell in that series.)

The <End> key works the same way with the other cursor keys, and that makes finding the beginning and end of data series remarkably fast and easy. (Note: Using <End> plus the cursor keys is a good way to check whether a row or column is empty before you delete it.)

You can also review your spreadsheet one screen at a time, if you like, vertically or horizontally. Vertical is easy: Use **<Page Up>** and **<Page Down>**. Press **<Ctrl>-<Left>** or **<Ctrl>-<Right>** to move the cursor a screenful to the left or right for a horizontal view.



THE SMARTICONS IN 1-2-3 FOR WINDOWS let you build a custom palette of handy tools that speed up common tasks.

Forming Formulas

Once you master navigation in spreadsheet land, you can use those skills to build mathematical formulas. When entering a formula that calls for a range argument, you can select the range in the spreadsheet to enter it automatically. For example, if you type SUM(, you can then press the cursor keys to move the cell pointer to the top of a column of values. Press the period key to anchor the range. Then press **<End>-<Down>** to select the whole column of values for summation. To finish, type the closing parenthesis and press **<Enter>**.

Slash and Print

To print a fast draft of your spreadsheet, use the /Print command. You won't get any formatting or graphics, but /Print prints much faster than the :Print command in *1-2-3*'s Wysiwyg add-in.

When using Wysiwyg, know thy printer driver. If you're printing draft copies of graphics or ranges with lots of formatting, choose a driver that prints at medium or low resolution—between 75 and 150 dots per inch (dpi). For better quality, try a 300-dpi driver like the HPLASR4 or the XHPLJ2C driver. (The XHPLJ2C driver is generally faster because it downloads fonts, while the HPLASR4 does not.) To switch between available drivers while using release 2.4, choose the *:Print•Config•Printer* command. In release 3.1+, select *:Print•Configuration•Resolution•Draft.*

If you need to print many reports but don't want to wait around, try printing to encoded files and then printing the files later. Create an encoded file by selecting *:Print•Encoded.* To print to an encoded file, select *:Print•File* and enter a file name with ENC as the extension (say, 92END1.ENC). After you've created an ENC file, you can print it by typing **COPY /B** *filename*.**ENC PRN** at the DOS prompt. The resulting report looks exactly like one printed from within *1-2-3*, complete with fancy formatting and graphics. You can even use wild cards to print multiple ENC files: For example, type **COPY /B *.ENC PRN** at the DOS prompt to print all the ENC files in the current directory.

—Nicholas Delonas

Working Smart in 1-2-3 for Windows

Get Smart

Talk about choice: If you're used to DOS versions of *1-2-3*, you can always press the slash key to go to the *1-2-3* Classic menu. Pressing the colon key even displays the Wysiwyg formatting menu. But hey, you're in *Windows*. Why not do yourself a favor by using SmartIcons and other features unique to the *Windows* version?

The SmartIcon palette is a veritable warehouse of shortcuts you can customize to fit your way of working. To customize your SmartIcons, choose *Tools•SmartIcons* and click the *Customize* button. You'll see the current SmartIcon palette in a list box next to a Standard icons list box. Scroll through the latter list, click on an icon, and you get a description of the function in the Description box below it. If you find an icon you like, double-click it to add it to your current palette. (A few of my favorite SmartIcons

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are Cycle through colors for backgrounds, Copy current cell into selected cells, Insert rows, and Insert columns.) To make room for your new icons, jump over to the Current palette box and double-click the icons you don't want. When you're satisfied with your new palette, click *OK* to save it.

Cell Block

Chances are, you issue a command like Style•Font and then select the range of cells to which it applies. But if you select a range *before* you issue a command, the selection remains active after the command is executed, making it easier to perform another operation on the same range.

Help Where You're At

Here's an easy way to get help with @functions. When you need to enter an @function, press @ and then **<F3>** for a list of all functions. Press **<F1>** for the @Function Index. (You can follow a similar procedure when entering macro commands. Enter a left brace { and press **<F3>** for a list of all macro commands. **<F1>** displays the Macro Command Index.)

Peace Be Undo You

If you've blown it, you can back out with the Undo command. (First select *Tools•User Setup* and make sure Enable Edit Undo is checked.) Issue the Undo command by selecting *Edit•Undo* (or pressing **<Alt>-<Backspace>**). If you select Undo after executing a macro, your worksheet will be restored to its previous condition.

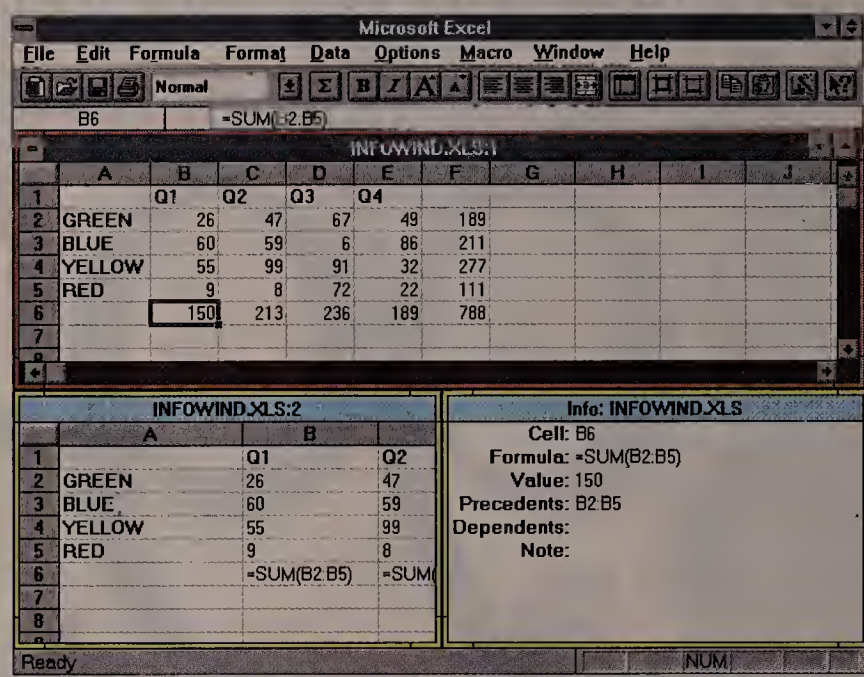
—John Walkenbach

Working Smart in Excel 4.0

Be a Copycat

What's the best way to save time building spreadsheets? Build something once and copy it. With *Excel*, I enter multiple copies of a formula or a value in a single step: First, I select the range(s) where I want the copies to go (holding down **<Ctrl>** and using the mouse to select multiple blocks of cells); then I build my first formula and press **<Ctrl>-<Enter>**. Every cell in the selection gets a copy.

To copy a formula or row of formulas to lower cells, select that formula or row and the target range, then press **<Ctrl>-D**. To copy a formula or column of formulas to cells to the right, select that formula or column and the target range, then press **<Ctrl>-R**.



ANALYZE YOUR FORMULAS IN EXCEL 4.0 by pressing <Ctrl> to toggle between views of formula values and formulas themselves.

And how about AutoFill? Sure, you can use it to create a series of entries, such as days of the week. But I also copy formulas with it: I enter the first formula, then use the mouse to drag the AutoFill handle to cover the range that needs copies. If AutoFill makes a series when I just want to make copies, I hold down **<Ctrl>** as I drag the AutoFill handle, and I always get straight copies. Hold down **<Shift>** as you drag the AutoFill handle and you'll insert blank cells, shifting adjacent cells down or to the right.

The drag-and-drop feature lets you select and move a cell, range, row, column, or graphics object, but hold down **<Ctrl>** while you drag, and you'll drag a copy of the cell or object.

When you need to duplicate just the formatting from one range to another, select the range, then click the Copy tool on the standard tool bar. Now select the range to be formatted and click on the Paste Formats tool. If you're copying a set of formulas but need to convert them to values, use the Copy tool to make your copy, but instead of selecting Edit•Paste Special•Values, just hold down **<Shift>** and click the Paste Formats tool.

You're Selected

When it comes to selecting ranges in a spreadsheet, the mouse is a pretty blunt instrument. Instead, hold down **<Shift>** and use the cursor keys to extend the range selection. The selection extends away from the active cell. Press **<Ctrl>-<Period>**, to switch the active cell to each corner of the selection, changing the extensible corner of the range. I use this trick to adjust the corners of a selected range without canceling the selection and starting over.

When the range is large, start on one corner, hold down **<Shift><End>**, and then press a cursor key: The selection extends to the last filled cell in that direction.

Try putting the cell pointer in a block of entries and pressing **<Ctrl><Asterisk>**. *Excel* selects the current block based on a pattern of adjacent filled cells. If it guessed wrong, hold down **<Shift>** and use the cursor keys and **<Ctrl>-<Period>** to adjust the selection.

Formula Wrestling

When formulas get complex, it can be hard to figure out how they work. Checking the value of parts of a formula can help. Select the cell that contains the formula, and press **<F2>** to edit it. Use the mouse (or **<Shift>** plus the cursor keys) to select an expression, then press **<F9>**. *Excel* calculates just that portion of the formula and converts it to a value. Then select a more inclusive expression and repeat the process to understand how the formula was built. (Be sure not to enter the converted formula.)

To analyze formulas on a broader scale, try pressing **<Ctrl>`** (the reverse apostrophe key is to the left of 1 key) to toggle between viewing the values of your formulas (the normal way of looking at a spreadsheet) and viewing the formulas themselves. If you select *Window•New Window* and then press **<Ctrl>`**, you can compare formulas and their values side by side. Now, select *Options•Workspace*, check the Info Window check box in the Workspace Options dialog box, and click *OK* to see a window showing characteristics of the active cell. Press **<Alt>I** to access the Info menu, and choose the information you want, such as *Precedents* (the cells a formula refers to) and *Dependents* (cells that contain formulas that refer to the current cell). Now arrange your spreadsheet and Info

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windows so you can see them together on screen, and you're ready to take a very close look at your spreadsheet formulas.

—Richard Scoville

Working Smart in Quattro Pro 4.0

Keyboard Clues

In some ways, DOS heavyweight *Quattro Pro* feels like a *Windows* program. It provides 12 ways to do the same thing, such as letting me mouse around or use the keyboard to select commands. For my taste, though, the keyboard is faster than the mouse for selecting a block of cells.

For example, I like to select an entire current column of data (when the cell selector is not on the top cell) by pressing **<End><Up><Shift>-<F7><End><Down>**. To select the entire current row of data when the cell selector is not at the left edge of that data, I press **<End><Left><Shift>-<F7><End><Right>**. When the cell selector isn't in the top row or left column of the block, I select the area by pressing **<End><Up><End><Left>**, then **<Shift>-<F7><End><Down><End><Right>**. To select the entire active spreadsheet area, from cell A1 to the last cell that contains data, I press **<Home><Shift>-<F7><End><Home>**.

Formula and Function

It's a pain to enter all those dollar signs when I'm typing absolute cell or range addresses into formulas. Using <ABS>, the <F4> key, makes it much easier. Type the cell or range address into the formula, then stop. Press **<ABS>** one or more times to cycle the address between relative, full absolute, row absolute, and column absolute (you can view the changes on the input line). Then finish entering the rest of the formula as you would normally. <ABS> also works when you are editing a formula. Position the cursor anywhere on a cell or range address and press **<ABS>** to cycle through absolutes.

The @functions are one of *Quattro Pro*'s standbys, but who can remember all their names? When you're entering a formula that includes an @function, try pressing **<Alt>-<F3>** to display an alphabetic list of all available functions. Scroll through the list and select a function you want, and it is entered in your formula automatically—including the opening parenthesis after the function name.

No More Window Pains

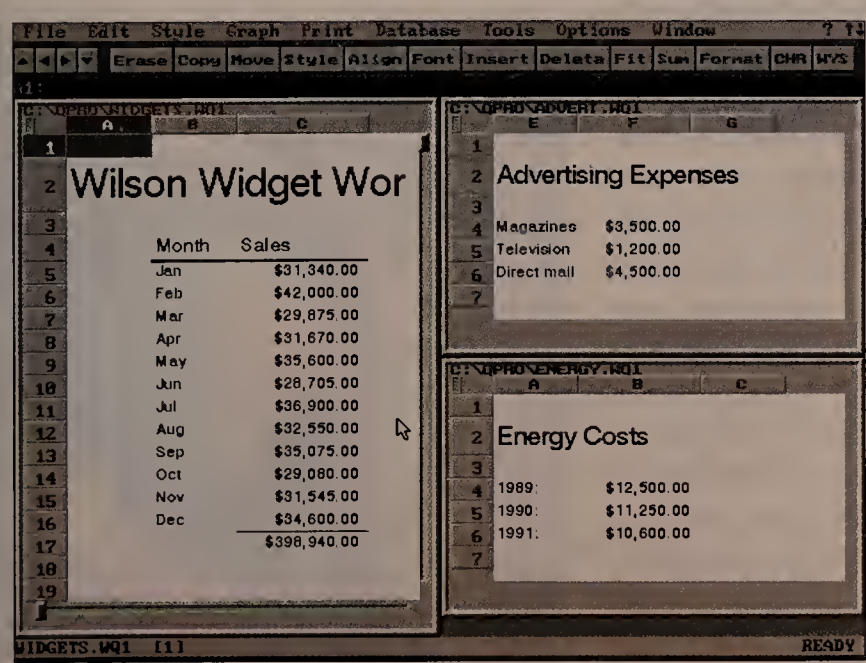
When you're using multiple spreadsheet windows, you can move quickly to any of the first nine windows by holding down **<Alt>** and pressing the number of the window. Can't remember the window number? Press **<Shift>-<F5>** for a list of window names you can select from. If you want to view all windows at once, press **<Ctrl>-T**. You can click the desired window with the mouse to make it active. Then, to zoom the active window to full screen, press **<Alt>-<F6>**.

If you like seeing your windows on the screen in a particularly convenient configuration, you can save time by saving the configuration as a Workspace and recalling it later. Select */File•Workspace•Save,* then enter a name for the Workspace file. To restore a saved Workspace, start *Quattro Pro* with the Workspace file name as a command-line argument (Q MYCONFIG, for example) or select */File• Workspace•Restore* once the application is loaded. Remember that saving the Workspace does not save the data in the windows; you must use */File•Save* in each window to save the spreadsheet data.

Beat the Oops! Blues

To keep your file intact, nothing beats a regular save (**<Ctrl>-S** or */File•Save*), of course. But what can you do to reverse individual errors in your worksheet? Undo 'em. To enable the Undo feature, select */Options•Other•Undo•Enable.* If you make a mistake, press **<Alt>-<F5>** or select */Edit•Undo* to reverse it. Be aware that Undo takes some memory and slows down some operations, so you may want to enable it only when you're working on unfamiliar or complex tasks.

—Peter Aitken



MOVE TO ANY WINDOW IN QUATTRO PRO by pressing <Alt> and the window's number.

GRAPHICS

Working Smart in CorelDraw 3.0

Elect Select

Everybody knows *CorelDraw* is full of great tools for drawing and type manipulation. But *CorelDraw* is also full of humbler but equally useful shortcuts for selecting text.

For example, let's say you're using the Text tool to edit a page. To select a word, double-click it; to select a sentence hold down **<Ctrl>** and click it, to select a string of text click one end, hold down **<Shift>**, and click the other end.

To move the insertion point within a text block, use the cursor keys; press **<Home>** to move the insertion point to the beginning of the current line and press **<End>** to move it to the end. **<Ctrl>-<Home>** takes it to the beginning of a block; **<Ctrl>-<End>** moves it to the end of the block. (Since it's sometimes hard to select text at the beginning of a block by clicking and dragging over it, try clicking anywhere in the block, pressing **<Ctrl>-<Home>**, then holding down the **<Shift>** key and clicking at the place you want the selection to end.)

Face-Lifts

If *Corel*'s default text font (24-point Avalon) isn't to your liking, you can change it permanently by using the *Windows* Notepad to edit the CORELDRW.INI file, located in your *CorelDraw* program directory. Find the line that reads 'DefaultFont=Avalon, 1,24' in the [CDrawConfig] section, and change 'Avalon' to the name of any PostScript font (provided you have *Adobe Type Manager* or a PostScript printer) or TrueType font installed on your system. The next setting, after the comma, lets you specify the weight of the default font: 1 for normal, 2 for bold, 4 for italic, or 8 for bold italic. The final setting is the point size.

You can save time in a *Corel* session by setting the font for the current insertion point. Just click on a blank part of the page with the Text tool. Then choose the desired typeface and size in the Text roll-up (or Character Attributes dialog box) and click *Apply*. When you type, the text appearing at the insertion point will be the one you specified. But the next time you click on a blank area of the page to make a new insertion point, it will revert to the default.

To set a default face for an entire session, choose the Pick tool, making sure no text block is selected, and define the desired attributes in the dialog box; click *OK* to confirm and all new insertion points will be in the face you chose. (The next time you run *CorelDraw*, it will revert to the default face in the INI file.)

Path-Ology

Text attached to a path is linked to that path *dynamically*—you can modify the text or the path separately without having to detach them from each other. The trick: Hold down the **<Ctrl>** key and click on the text to select it. You're now free to format or edit it as you would any text block.

It's also easy to create and manipulate type. Let's say you're tightening the spacing between the letters of some large display type to make it easier to read. Try selecting the character and nudging it by pressing the appropriate cursor key until it's in place. (In this case, I make sure the Nudge value in the Preferences dialog box is set to only 1 or 2 points.) You can also move multiple characters by holding down the **<Shift>** key while selecting them, or by dragging a selection marquee around them.

Conversions and Reversions

There's a faster way to convert existing text from paragraph to artistic mode, and vice versa. Instead of changing mode and retyping, choose the Text tool, select the paragraph, and choose *Edit•Copy*. Then switch to the Pick tool and choose *Edit•Paste* to create a new artistic text block. You can go the other way by selecting a block of artistic text and choosing *Edit•Copy*, then clicking and dragging with the Text tool to create a new frame, and then choosing *Edit•Paste*. Remember: For this tip to work, you have to use the Text tool to select the text.

—Chris Dickman

Working Smart in Harvard Graphics 3.x

Default Is Mine

I never bother hunting around for charts and presentations. Instead, I set up a default directory that tells the program exactly where my files are. At the main menu, I select *Setup•Program defaults* and press **<Enter>** three times to get to Directories Defaults (in the Program defaults screen). Then I change any of the default directories—for Data, Import, and Work files, for example—to the directories where I keep those types of files.

Do the Keyboard Shuffle

Whenever you finish a task using the keyboard, such as typing text in a form, press **<F10>** to get to the next menu, or press **<Esc>** to return to the previous screen. If you're using a mouse and you've finished a task, just press the right button to continue.

And if you forget *Harvard*'s litany of keystroke shortcuts while working on a chart—such as <Ctrl>-N to edit notes, <Ctrl>-B to insert fractions and other special characters, and <Ctrl>-P to print a chart—there's an easier way to remember them. Just press **<Ctrl>-<F1>** to produce a pop-up list of keyboard shortcuts.

Stop Mousing Around

When I'm using the Draw feature, it's often faster to use keyboard shortcuts than to mouse around. To select an editing tool, type the first letter of the tool's name—say, C for Copy, P for Paste, G for Group, or U for Ungroup—and then press **<Enter>**. For tools that start with the same letter—such as Delete, Duplicate, and Disconnect—I press the letter repeatedly until the tool I want is highlighted, and then press **<Enter>**.

You can also use the <Ctrl> key in combination with letter keys to bypass pulldown menus or select another drawing tool. For example, **<Ctrl>-G** gets you a chart, **<Ctrl>-S** saves a chart, and **<Ctrl>-U** gives you Undo. Press **<Ctrl>-T** to toggle between the Text tool and the Select tool.

It's a Draw

I hate having to wait for *Harvard* to redraw an entire chart every time I make a change. For top-speed redraw, press **<F8>1** to access the Redraw options list, set the redrawing quality to draft, and select *No* for all of the other display options (they control gradients, bit maps, subcharts, and button names). You can cancel a Redraw in progress by hitting **<Esc>** and restart the redraw by pressing **<Ctrl>-D**.

Zippy Printing

To improve printing speed for draft copies, try the following tips.

1. From the main menu, select *Setup•Printer 1* (assuming Printer 1 is your draft printer) to open the *Printer 1 Setup* menu. Select *Yes* for Use Spooler (which gets you back to work in *Harvard* faster) and *Draft* for Quality.

2. When working on a chart, press **<Ctrl>-P** (to print) and **<F8>** to open the Printer Options menu. Select *No* for Draw background color. If your printer comes with built-in fonts, select *Yes* for the Use Hardware Fonts Only option.

—Richard Jantz

Working Smart in PageMaker

A Zoom With a View

I find that *PageMaker* does my bidding most successfully if I treat keyboard and mouse as equal partners. At first, it was a lit-

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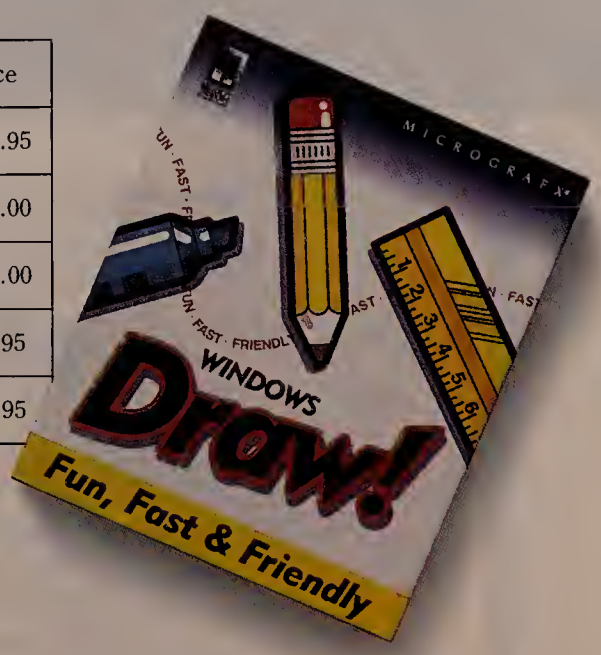

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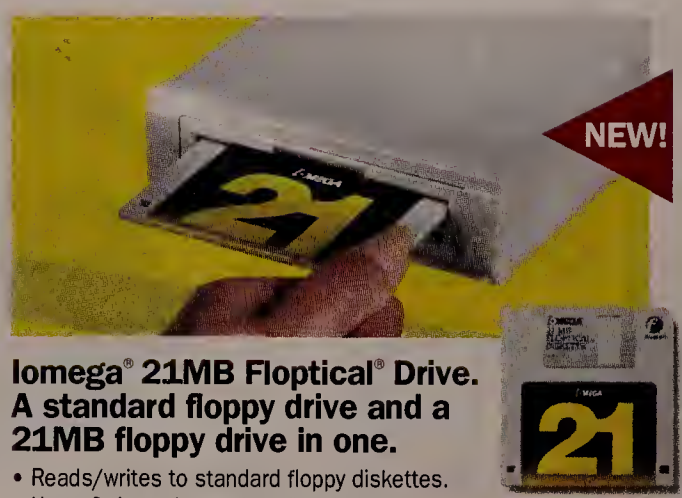

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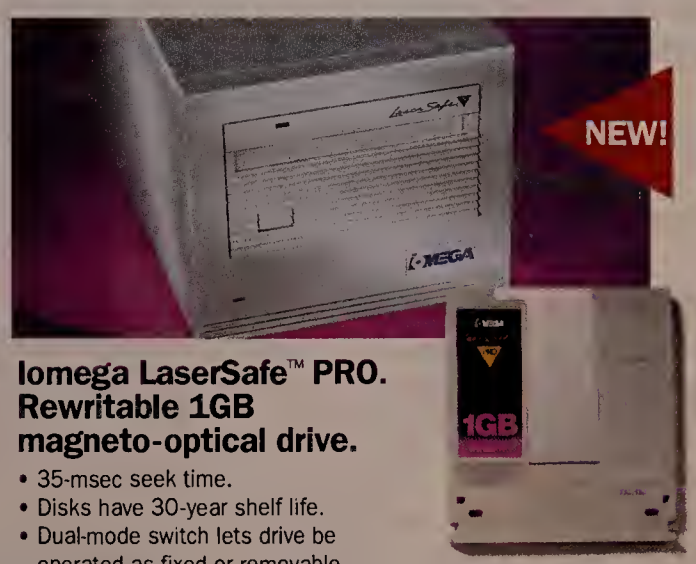

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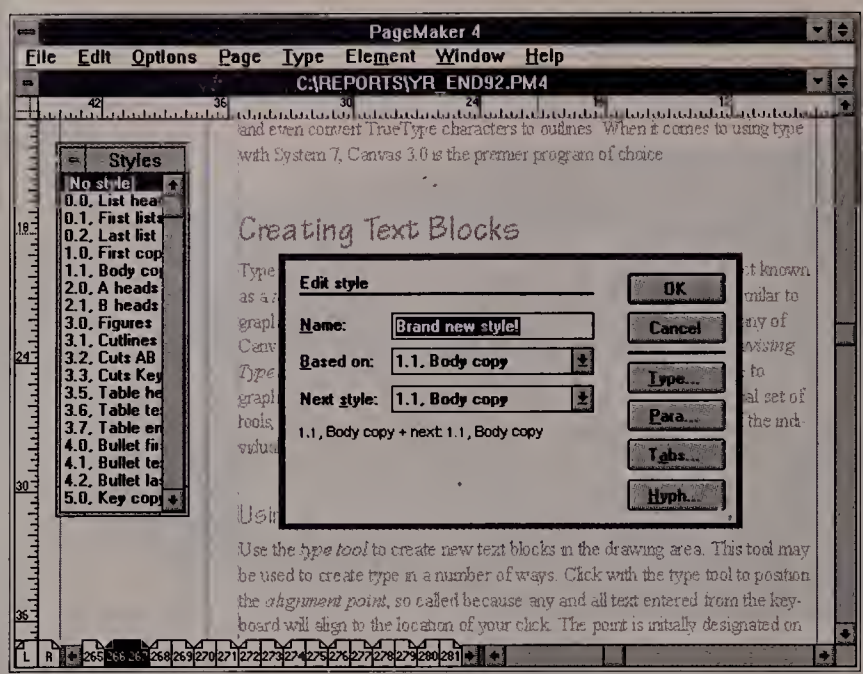

CREATE A QUICK STYLE IN PAGEMAKER by pressing <Ctrl> while right-clicking on the No style option in the Style palette.

tle like learning to drive with a stick shift, but with a little effort, <Shift>-clicking, <Ctrl>-dragging, and other combined operations became second nature.

For example, to toggle between actual view (100 percent) and fit-in-window sizes, I just click on the right mouse button. To zoom into 200 percent magnification, I hold down **<Shift>** while right-clicking the mouse. To zoom out to see two facing pages and the entire pasteboard, I hold down **<Shift>** while choosing *Page•Fit in window* or just press **<Shift>-<Ctrl>-W**.

Page Pranks

Tired of the scroll bars? Don't use them. Instead, hold down **<Alt>** and drag to access the grabber-hand pointer, which lets you move the page in any direction. And don't bother messing with the page icons when you want to turn a page. Instead, press **<F12>** to move forward a page and **<F11>** to move back one. To go to a specific page, press **<Ctrl>-G**, enter the page number, and press **<Enter>**.

Story Time

Mice are great for selecting text, but you can also use the text tool and double-click on a word to select it, or triple-click to select a paragraph. Press **<Ctrl>-A** to select all the text in the current story.

If you prefer to keep your hands on the keyboard, hold down **<Shift>-<Ctrl>** and press **<Right>** or **<Left>** to select the next or previous word. Pressing **<Shift>-<Ctrl>** with **<Up>** or **<Down>** selects entire paragraphs.

To check spelling or to search and replace characters, triple-click a text block with the Arrow tool or press **<Ctrl>-E** to enter the Story Editor, then choose *Edit•Spelling* or press **<Ctrl>-L**. If your insertion point is blinking inside the story already, press **<Ctrl>-E**. Press **<Ctrl>-E** again to return to the layout view.

Editing With Style

Style sheets are real work-savers. Any time you format a paragraph of text, save it to a style sheet so you can reapply the formatting to other paragraphs easily. Assuming the Style palette is available (**<Ctrl>-Y**), just hold down **<Ctrl>** while clicking on the *No style* option to define a new style. If you ever want to edit the style sheet—and consequently reformat all text associated with that style—**<Ctrl>**-click on its name in the Style palette.

Grappling With Graphics

There's no substitute for the mouse when selecting graphics. But when one graphic overlaps another, or when text and graphics overlap, the mouse isn't enough. Instead, press **<Ctrl>**-click to select the top object (text block or graphic) in a stack, **<Ctrl>**-right click again to select the next one down, and so on until you select the object you want. When you drag that object, it automatically moves to the front of the stack.

If you use photographic scans and other bit-mapped images (PCX or TIFF files), remember this trick: To ensure that the resolution of your imported image matches the resolution of your final output device—so you don't get any unsightly patterns showing up in your pictures—select the printer model using the *File•Target printer* command, then hold down **<Shift>-<Ctrl>** and drag a corner handle of the image to scale it.

Tooling Around

Here's a tip that will elevate you from *PageMaker* novice to all-around pro. Close the Toolbox—it consumes too much valuable space on screen—and assign the following keyboard equivalents to the inner recesses of your personal memory banks.

To select the Text tool, press **<Shift>-<F4>**. To toggle back to the Arrow tool, press **<F9>**. You can access the other tools from the keyboard as well—**<Shift>-<F2>** selects the Line tool, **<Shift>-<F8>** gets the Crop tool—but how often do you use them? For most situations, **<Shift>-<F4>** and **<F9>** are all you need.

—Deke McClelland

DATABASES

Working Smart in dBASE IV

Strings Attached

With *dBASE*, I get an eclectic menu of working environments—the Control Center, the infamous dot prompt, a group of interactive form designers, and a built-in programming language. One key to working smarter with *dBASE* is to take advantage of what each mode has to offer.

Because *dBASE* has a built-in programming language, it offers a wide array of functions that let me carry out specialized calculations and data transformations. (Even if you're allergic to programming, you can use these functions to manipulate dates and character strings.)

For example, I sometimes use the UPPER() function to convert a string to all uppercase. To print a name field in uppercase on a report, I add the expression **UPPER(***Name***)** to the report, and to index on the state, regardless of how the state abbreviation was entered, I use the expression **UPPER(***State***)** in the index key expression.

The TRIM () function removes trailing blank spaces from a string. You can use this function to combine strings on reports and labels and avoid unsightly gaps that would result from partly empty fields, as in the expression **TRIM(***City***) + ", " +** *State* **+ " " +** *ZIP*. For example, you can use an array of date manipulation functions to format dates on reports, including **CDOW(***duedate***)**, which evaluates to the day of the week, spelled out (for example, 'Tuesday') and **CMONTH(***duedate***)**, which yields the name of the month.

Index Fingers

dBASE can index on a field of any data type, but when you combine fields of different data types, you can use functions to convert all of them to character strings. For example, to index a transaction file on a

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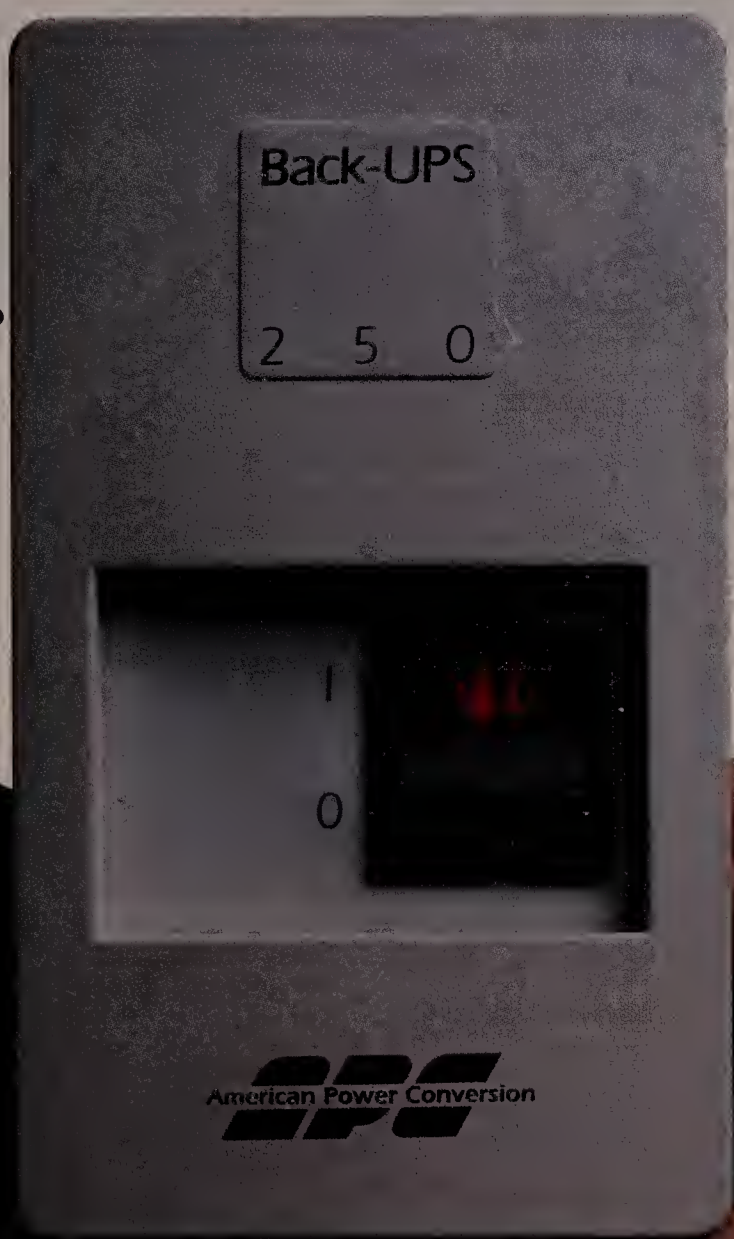

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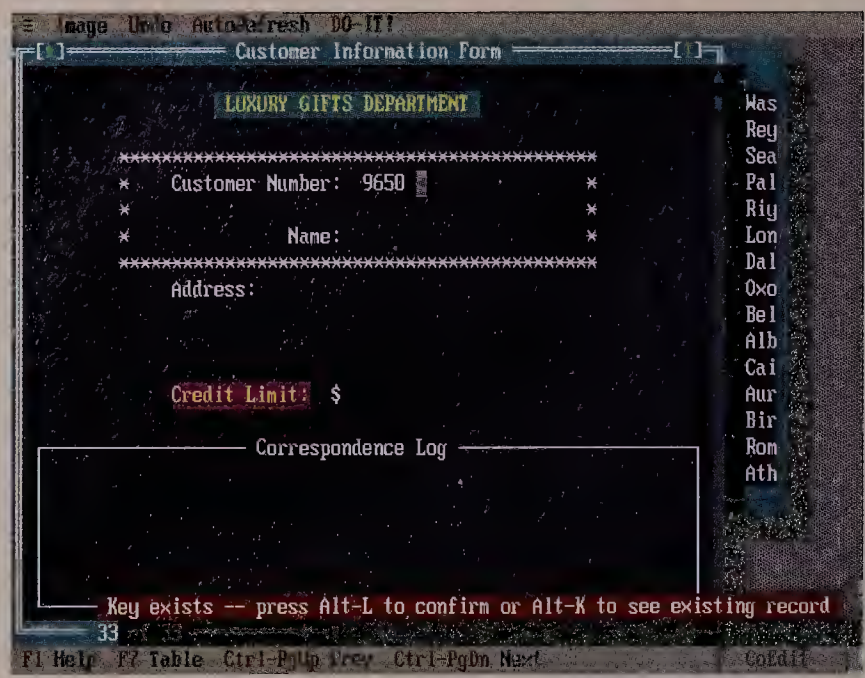


CHANGE DEFAULT FORMS IN PARADOX by selecting Image • Pickform to show the form you want to use, then selecting Image • KeepSet.

character field called IDCODE, and within each IDCODE group, by a date field called TRANDATE, you can use the DTOS function (which converts a date to a character string in year/month/day order to achieve correct chronological order) in an expression like Idcode + DTOS(Trandate). To index in reverse chronological order, you need a more complicated expression that subtracts the date from an arbitrary future date later than any you anticipate in your database (say, December 31, 1999). The subtraction yields the number of days between the two dates, and this number will be smaller for later dates; those which will fall earlier in indexed order. To combine this numeric result with a character field, you can use the STR function to convert it to a four-digit number, as follows: Idcode + STR({12/31/99} - Trandate, 4).

Go Dotty

If you are new to *dBASE* and have been working exclusively in the menu system, you can work a lot faster with the dot prompt commands than you can using the menu-driven Query by Example (QBE). For example, to compute more than one summary statistic based on the same field, you must add two copies of the database to the query. Using the CALCULATE command at the dot prompt, you can carry out multiple calculations easily. The formula CALCULATE MIN(Trandate), MAX(Trandate), SUM(Amount), AVG(Amount), MAX(Amount) calculates the earliest and latest transaction dates and the sum, average, and maximum transaction amounts.

Instead of using QBE exclusively to carry out inquiries based on multiple databases, you can open and link the files at the dot prompt using the USE, SET RELATION TO, and SET SKIP TO commands. These let you link databases based on any expression, not just a field or index present in both files. For example, you could link a name and address database to a transaction file that's indexed, like the expression described above, on a character field and a date. To accomplish this from the dot prompt, open both databases, each in its own numbered work area and with the transaction field ordered on the combined character and date index (in this example, called IdDate):

SELECT 1
USE Names ORDER StateId
SELECT 2
USE Trans ORDER IdDate

To establish the link, use a SET RELATION command executed from the work area you want to be active, followed by a SET SKIP command if the relationship is one-to-many:

SELECT 1
SET RELATION TO Idcode INTO Trans
SET SKIP TO Trans

After some experience working at the dot prompt, you'll be surprised at the power, speed, and flexibility you'll gain.

—Miriam Liskin

Working Smart in Paradox 4.0 for DOS

Field Flux

I love *Paradox*'s report designer but there's no easy way to copy and move fields. Here are a few quick tricks to increase efficiency.

To copy a calculated field, use the Instant Scripts feature. First I position the cursor where I want the field and press **<Alt>-<F3>** to start recording. Next, I use *Field • Place • Calculated* to create the calculated field. When the field is in place, I press **<Alt>-<F3>** again to stop recording the script. Then I move the cursor to the next place I want to use the same field (or a similar one) and press **<Alt>-<F4>** to run the script and create a new field. If I need to change the expression, I use *Field • Reformat.*

If you need to move a field at the left margin to the end of the previous line in a free-form report, press **<Insert>** to go into Insert mode, place the cursor at the beginning of the line and press **<Backspace>**. And in tabular reports, save time by pressing **<Ctrl>-R** to rotate a column just like when you are viewing a table and pressing **<Tab>** or **<Shift>-<Tab>** to move the cursor from column to column.

A New Image

Sometimes you'd like to see a different form than the default F form that *Paradox* uses when you press <F7>, or use the Form Speedbar button. To change the default, use *Image • PickForm* to show the form you want to use, and then *Image • KeepSet.*

There's no rule that says you have to keep the standard R report in its original form. If you want to print a different report when you press <Alt>-<F7>, you can copy the report of your choice to the R slot using *Tools • Copy • Report • SameTable.*

Edit, CoEdit

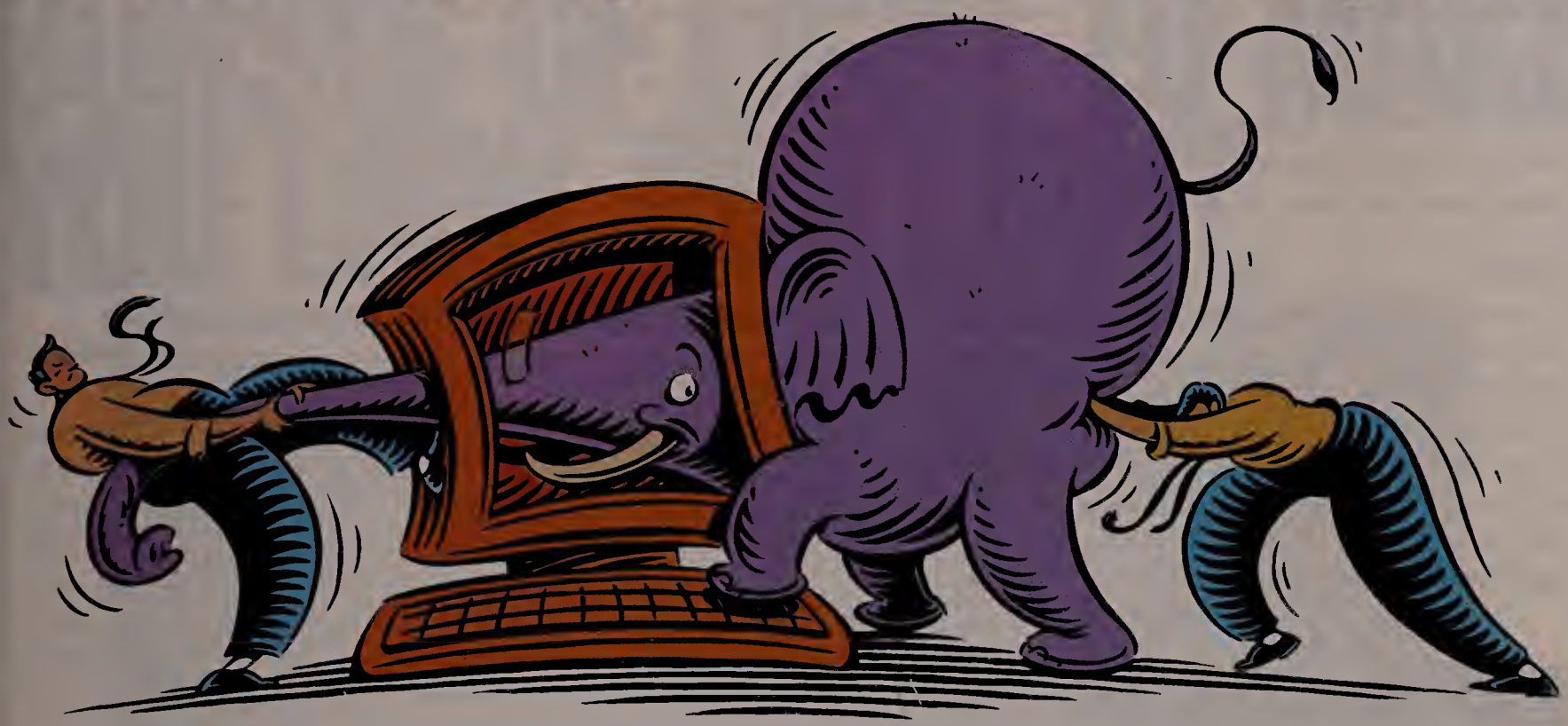
Paradox's hot-keys in Edit and CoEdit mode make it easy to edit tables fast. **<Ctrl>-<Backspace>** erases an entire field; **<Ctrl>-D** copies a field value from the previous record into an empty field, and **<Ctrl>-F**, **<Alt>-<F5>**, or a double-click of the mouse button, brings you into Field View, where you can readily change a field value without having to erase it first.

If you make a mistake, you can use Undo (**<Ctrl>-U**) to reinsert a deleted record, delete an inserted record, or return an edited record to its original state. **<F9>** brings you into Edit mode when a table is in your work space; similarly, **<Alt>-<F9>** or the CoEdit button on the Speedbar puts you into CoEdit. You can move freely between table windows while editing or coediting by pressing **<F3>**, **<F4>**, or **<Ctrl>-<F4>**.

ValCheck It Out

When it comes to data entry, the ValCheck feature is an ideal time-saver. You can use it to do things like fill in and format values

There's An Easier Way To Get More Memory Into Your Computer



If you've been struggling to get the most out of your PC's memory, there's an easier way. It's called NETROOM – the award winning memory manager that uses the newest technologies to shatter memory barriers, giving you more memory and a faster system.

CRASH-PROOF

With *"Customize"*, NETROOM's crash-proof installation utility, you can configure all of NETROOM's features automatically – just type one command and you're done! Even if you turn off your system in the middle, when you turn it back on *"Customize"* will pick up where it left off. Of course, you can always customize *"Customize"* if you like.

But there's more to memory management than just easy installation. NETROOM includes our revolutionary *"Cloaking"* technology – a technique that allows DOS drivers and TSRs to run in extended memory as if they were running under Microsoft Windows™. *Even if you never run Windows!* If you do use Windows, you'll find our cloaked utilities fully Windows-compatible.

NETROOM provides a cloaked system BIOS for all compatible systems including ISA, EISA, MCA and Laptops. NETROOM's cloaked BIOS is designed to run in the "protected mode" of your 386/486 family processor. This makes it safer to use. The cloaked BIOS also takes full advantage of the 32-bit power of your computer so it runs faster. And it doesn't occupy any DOS memory, so you save up to 96K. Think of it as a *free* BIOS upgrade that saves memory and makes your system run faster.

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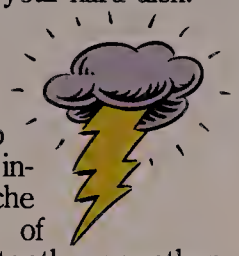

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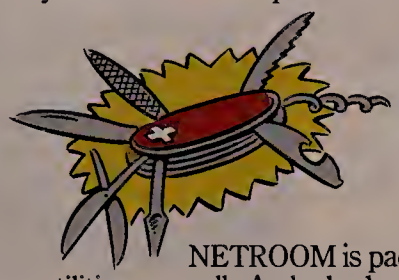

SOME PRETTY SHARP TOOLS

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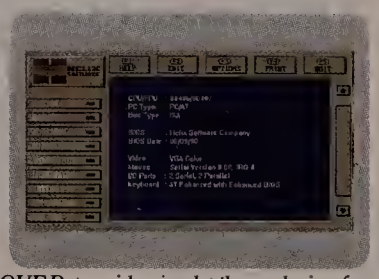

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and check against lookup tables. To add ValChecks to a table while you're editing, choose *ValCheck • Define* while in Edit mode.

Spacebar, the Final Frontier

Why waste time typing in dates in the Date field? Instead, when you're in the default mm/dd/yy format, just press **<Space>** to fill in the current month, tap again for the current day, and tap a third time to fill in the year.

Sort It Out

If you've been relying on the Sort command to order records for a report, you have to use it every time you run your report. It's much easier to use the Group command in Report mode. Groupings always override the sorted order of the underlying report table, and you have to add them to your report design only once.

—Celeste Robinson

ACCOUNTING

Working Smart in Quicken 6.0

Quick Starts

I like *Quicken* because among other things, it lets me work fast. I can load files automatically, change between accounts, and use some easy keyboard shortcuts to get my accounting over and done with.

For example, let's say I know the account I'm going to use—call it 'Cash92'—I just type **Q Cash92** at the DOS prompt, and *Quicken* loads it automatically. If I have more than one file, I type the account name followed by a space and the file name. For example, Q Wells Business gets me into my Business file and Wells account.

Jump Shots

Quicken's shortcut keys let you jump from one place to another with amazing agility. For example, you can assign a Quick Key number to each of nine accounts and change accounts fast by holding down **<Ctrl>** and pressing the corresponding number. It's easy to copy a transaction within the same account or to another account in the same file: Press **<Ctrl>-<Insert>** on the transaction you want to copy and paste it into an empty transaction with **<Ctrl>-<Insert>**.

Fiddling with the register's date field when entering data that's very old gets, well, kind of old. Try T for today, and M for the beginning of the month. It's even better to use *Quicken*'s Quick Calendar: Press **<Ctrl>-K** to pop it up, scroll to the date you want, and press **<F9>** to paste it in.

Why plow through a half-dozen keystrokes to create the same report each session? Once the report's on screen, memorize it with **<Ctrl>-M**. Forgot to memorize it? Use **<Ctrl>-Z** to call up the last report you used.

Say you're in a cash flow report and want to figure out how $10,000 got into the Miscellaneous category, before your boss does. With your cursor on a particular figure, press **<Ctrl>-Z** to display the list of the transactions that produce the total amount.

Want to recategorize an item? Press **<F9>** to get back to the Register, **<Ctrl>-T** to get to the list, and **<Ctrl>-E** to change the category. **<Ctrl>-Z** zaps you back to the report.

Bill Time

Do you pay the same bills at the same time every month? There's no need to remember the date *or* the categories these bills fall into. *Quicken* will batch your memorized transactions, remind you when they're due , and enter the entire group into your register. All you have to do is enter the amount of each bill and print them. From the Register, press **<Ctrl>-J** and just fill in the blanks.

Filling It Up

You probably take advantage of QuickFill—*Quicken*'s database of every check you write—to fill in transaction fields automatically. But creating memorized transactions for regular events can be done even more quickly. Because I do most of my banking through convenient automated teller machines, I've created some memorized transactions for the typical amounts I withdraw. For example, when I press **1** from the Payee field, QuickFill brings up '100-ATM' and **6** gets '60ATM,' each with the correct amount of the transaction already filled in.

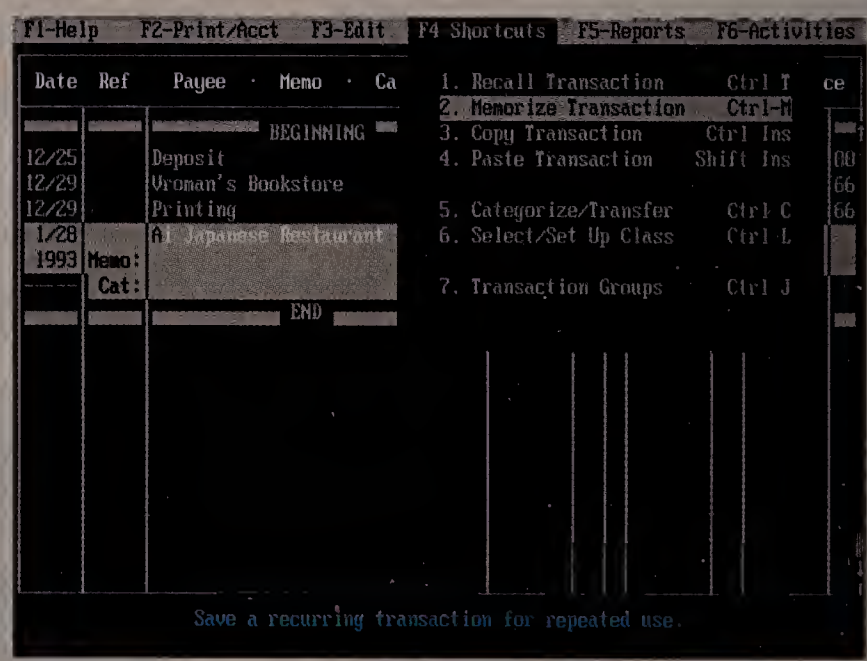
Transfer Tricks

It's easy to transfer between accounts in *Quicken*. Say you are thinking of selling your house, so you keep careful track of all home improvement expenditures and add them to the base cost of your house.

The easiest way to go about doing this is to set up a new account, let's say, Home Improve, choose *Other Asset* for the type of account, and enter the price you paid for your house. The next time you pay for something that's considered a legitimate home improvement, choose your Home Improve account and you'll automatically tally the improvement into the increased value of your house.

—Steve Bass

Peter Aitken is the author of Up and Running with Quattro Pro *(Sybex Computer Books, Alameda, California, 1993). Nicholas Delonas is coeditor of* The Spreadsheet Consultant *newsletter (Allston, Massachusetts). Chris Dickman is the author of* Mastering CorelDraw *(Peachpit Press, Berkeley, California, 1993). Lynn Launer is a former* Word *product support technician for Microsoft Corporation. Robert Lauriston is a frequent contributor to* PC World. *Miriam Liskin is the author of* Liskin's dBASE IV 1.1 Handbook *(Osborne/McGraw-Hill, Berkeley, California, 1991). Deke McClelland is the author of* The First Book of PC Paintbrush *(Howard W. Sams, Carmel, Indiana 1992). Kay Yarborough Nelson is the author of* Voodoo WordPerfect for Windows *(Ventana Press, Chapel Hill, North Carolina, 1992). Steve Bass, George Campbell, Richard Jantz, Celeste Robinson, Richard Scoville, Dan Tynan, and John Walkenbach are contributing editors and Bronwyn Fryer is an associate editor for* PC World.



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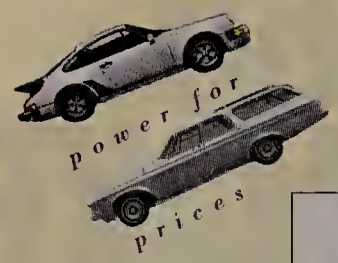

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386SXL/25
386SL/25
Best Buy, April 1993

486DX/33
Best Buy, Laptop Issue, Sept. 1992

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486SX/33	INTEL 80486SX-33 MHz, 8K CPU CACHE	80	$1,999 $74/mo*
486DX/33	INTEL 80486DX-33 MHz, 8K CPU CACHE	130	$2,499 $93/mo*

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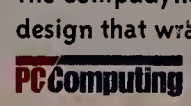
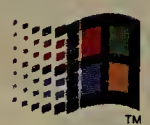


"The Compudyne SlimNote 4DX/33... (uses) a marvelous design that wraps a 33 MHz 486DX in a package just over 6 lbs. (This was one) of our favorites." (12/92)



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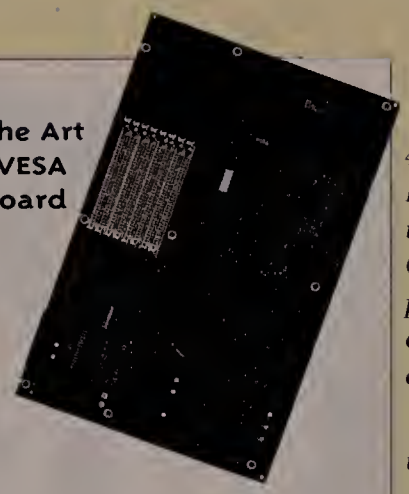

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486DX2/66 CACHE	INTEL 80486DX2-66 MHz, 128K CPU CACHE,	4 MB/ 245 MB HD		$1,999 $74/mo*
486DX/50 CACHE	INTEL 80486DX-50 MHz, 128K CPU CACHE	8 MB/ 340 MB HD		$2,299 $93/mo*

PC WORLD BEST BUY

486SX/25 Best Buy, Dec. 1992

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PCW0531

Circle 14 on reader service card

Search and Destroy: Antivirus Software

The enemy: a deadly suite of real-world viruses.

The defense: antivirus programs that scan for, monitor, and wipe out invaders.

Find out which of the 18 programs we tested protect data best against the onslaught.

When the Michelangelo menace became a worldwide media event last year, the resulting coverage dramatically increased the computing public's awareness of the virus threat. To almost everyone's relief, the virus failed to inflict the widespread destruction that experts had predicted. Unfortunately, Michelangelo's fizzle may also have instilled a false sense of confidence at firms with a high risk of viral infection. If you got stung this year on the artist's March 6 birthday, you're aware of the penalty for ignorance.

In recent studies, more than 5 percent of the companies interviewed had experienced "disastrous" losses due to viral infection, with total U.S. business losses as high as $1 billion a year. These programs can destroy individual files or erase the contents of an entire network's hard disks, and there is no absolute guarantee of immunity from infection.

To make matters worse, new strains are proliferating, including "stealth" viruses that hide themselves from most basic detection techniques, and mutating viruses that create unique versions of themselves that are likewise tough to track down. Prevention is your best protection, and that means adopting safe computing practices, including the use of a high-quality antivirus program.

To help you make a plan to keep your PC healthy, we'll give you an overview of the workings of computer viruses, outline steps you can take to reduce the chance of infection (see "Safe Computing"),

By Scott Spanbauer

JOSE CRUZ

and compare 18 antivirus utilities. We looked at every program we could find—both commercial and shareware—that combines virus scanning, virus removal, and memory-resident antivirus monitoring.

We tested the antivirus programs using a suite of 13 real viruses provided by the National Computer Security Association. The test viruses represent a range of virus types you're likely to encounter and include both well-known and uncommon strains. However, there are thousands of viruses and variants in existence, and the results of our testing can't guarantee a program's performance when it encounters a virus we didn't test.

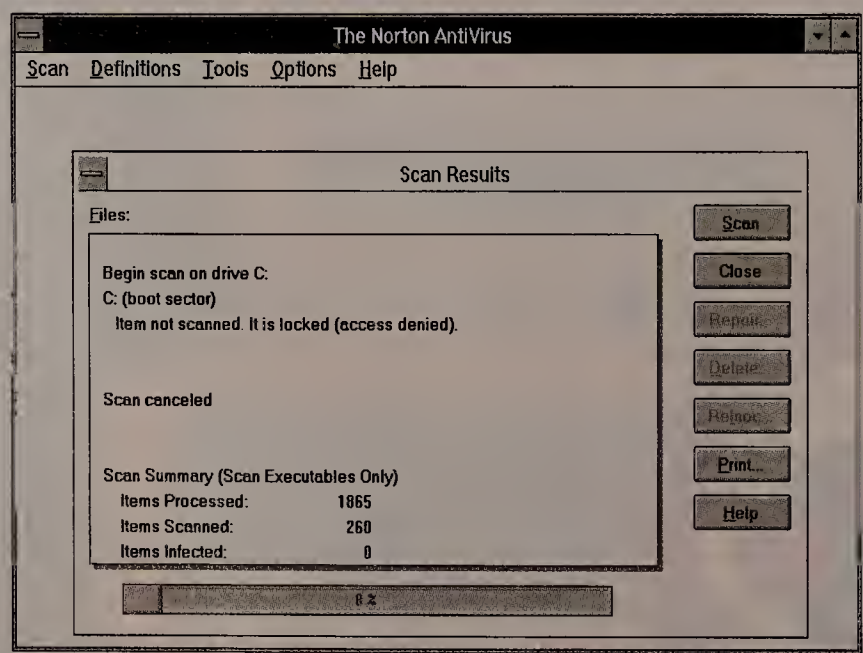
No single program can protect against every virus. As a result, if you're serious about avoiding a viral disaster, you should use at least two different programs that both excel at scanning for and removing disk-based viruses and scrutinizing a system for signs of viral activity. Most important, the programs you choose should be easy to install, configure, and use. If you have to be a technical guru to get the most from a program, you're unlikely to use it to full effect, if at all.

Under the Microscope

If you've managed to avoid infection thus far, you're probably in the low-risk category: You rarely download programs from private bulletin board services, rarely copy files from other systems using floppies, and aren't hooked up to a LAN. All these activities put your computer at risk, because viruses attach themselves to executable program files and floppy disk boot sectors. Booting from an infected floppy or launching a virus-bearing program triggers the virus's replication mechanism, allowing it to spread throughout your hard disk. Just avoiding high-risk computing won't provide absolute protection, however. Shrink-wrapped software and new computers have both been known to come out of the box already infected.

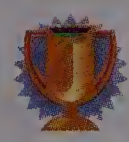
Different virus types infect a system in different ways. Boot-sector viruses like Stoned and the infamous Michelangelo infiltrate low-level code in the partition table or the boot sector. This type of virus is the most pernicious because it activates each time you start your computer, until you cold boot from a virus-free floppy.

Another type of virus infects programs—COM, EXE, overlay files, and DRV and SYS device drivers, including DOS's hidden IO.SYS and MSDOS.SYS system files. File-infecting viruses like the Jerusalem family spread in one of two ways: When the infected program is executed, the virus either searches one or more of your disks for executable files to infect or installs itself as a terminate-and-stay-resident (TSR) program that infects every program you subsequently execute. The first type of infection can damage just one file, several randomly selected ones, or every single executable file on your disks. Some viruses even combine file and boot-sector infection mechanisms.



BEST BUY NORTON ANTIVIRUS comes in a Windows version with an easy-to-use virus scanner.

Best Buy



Norton AntiVirus* gets the nod for Best Buy. It has a clean, easy-to-use interface, a rich feature set, and very good virus detection and prevention performance. Runners-up are *Virex, Dr. Solomon's Anti-Virus Toolkit,* and *Virus Prevention Plus.

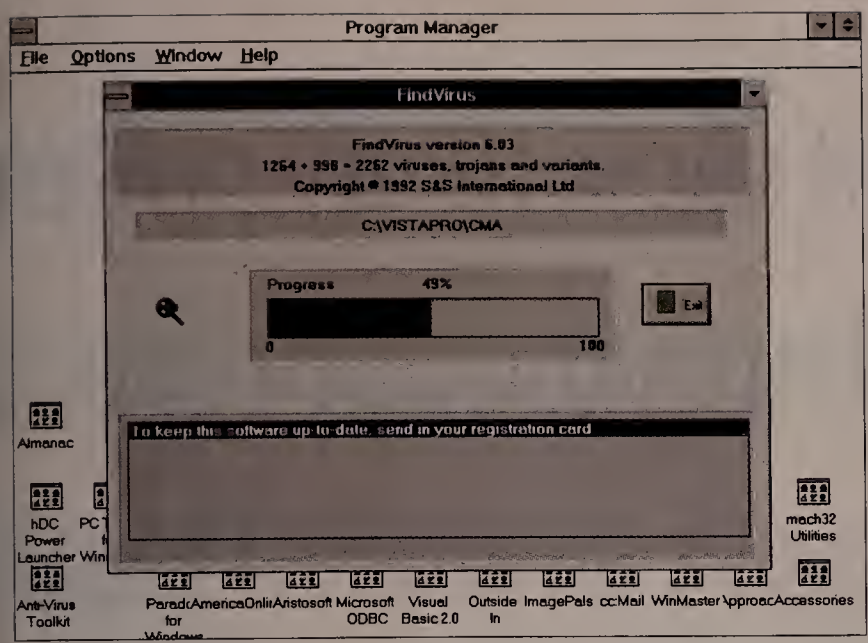
Virus Biology

Many viruses, Twin-351 among them, do little damage other than replicating themselves and displaying a cute message. The worst, however, incorporate a *logic bomb*—destructive code that waits until a particular date arrives or another condition is met to permanently destroy files or boot sectors or to reformat your hard disk. Some viruses wait quietly for the logic bomb trigger date, others announce themselves through obvious symptoms. You may see an unexpected message (such as Stoned's 'your computer is now stoned') or upper-ASCII garbage characters on your screen, or you may simply notice that program execution has slowed down—a sign that some rogue program is doing a little unsolicited hard disk housekeeping. One of our test viruses, the Grand York File, doesn't even wait. It immediately trashes your hard disk's partition table, then crashes the system. When you reboot, drive C: no longer exists.

The simplest and most effective virus detection scheme is to search all programs on a disk for embedded text strings that are part of all viruses and can be used to identify them. It's the only way you can know for sure which virus has infected your system. Some stealth viruses, however, can circumvent string-searching detection by fixing infected files on the fly or by encrypting themselves to hide telltale code.

An antivirus program's second line of defense is usually to calculate a mathematical fingerprint of hard disk files (called a checksum or file signature, depending on the exact technique used), then reinspect files at boot-up and compare against the original fingerprint for changes. Stealth viruses can sometimes foil this technique, depending on how well the antivirus program maintains and monitors the fingerprint. A few viruses are even known to infect antivirus programs themselves and to alter their file signature databases.

Mutating viruses avoid detection by recreating themselves as unique, randomly generated versions that may be of any length, may not contain any identifying code, and may employ stealth technology. Often these new viruses actively employ some or all of the parent virus's replication and logic bomb algorithms, or even include a complete toolbox of algorithms for creating new mutant viruses.



THE WINDOWS VERSION OF DR. SOLOMON'S ANTI-VIRUS TOOLKIT has a scanner that is particularly fast and provides good feedback.

Since techniques for detecting known viruses are unlikely to work on mutant strains, many antivirus programs now employ rule-based algorithms that detect the presence of a virus by looking for virus-like behavior on the system.

Give Me a Remedy I Can Use

Even the smartest antivirus software is useless if it goes unused. You'll be tempted to pull the plug on any program that gets in your way or slows you down. An easy-to-understand installation program that installs or creates all key elements, including memory-resident monitors, file signatures, and emergency disks, is best. All the reviewed programs, with the exception of the *ViruScan/Clean-Up/VShield* suite, offer an installation program. (These three programs can work separately but should be used as a group.) *Data Physician Plus* and *Dr. Solomon's Anti-Virus Toolkit* don't automatically install all their TSRs—you have to read the manual carefully to find out about their additional memory-resident features. *Virus Alert* doesn't install its TSR, but the program's excellent, hypertextlike on-line documentation provides a thorough explanation of its use and installation. *Pro-Scan* doesn't install its TSR at all, and it doesn't even come with printed documentation—there's just a text file that briefly mentions the existence of the memory-resident program. *Novi*'s install program doesn't automatically create file signatures, and *Vi-Spy* creates a boot-sector backup file, but you have to know to copy it to a floppy disk.

In addition, since you'll want to use more than one antivirus program but only one program's memory-resident and boot-up options, an uninstall option will make switching between programs quicker and easier. Only *AntiVirusPlus*, *Central Point Anti-Virus*, *Data Physician Plus*, *PC Rx*, *ViruCide Plus*, and *Virus Prevention Plus* offer an uninstall option.

The Right Mix of Protection

A program's scanning, disinfection, and memory-resident portions should be fairly swift and easy to understand and should generate helpful, accurate messages during operations, especially when encountering a virus. With only a few exceptions, all the programs here performed admirably. When we attempted to remove viruses using the repair menu command in *Dr. Solomon's Anti-Virus Toolkit*, the program scanned for and detected—but didn't remove—them. Strangely, the same command, when issued from the DOS prompt, worked as expected. The company's tech support staff had no explanation for the anomaly. *PC Rx* had the opposite problem; although it did a great job of finding viruses and keeping them out of memory, it often reported infection by viruses it had in fact blocked. *Virus Prevention Plus* is an excellent virus sleuth, but it burdens you with an obtrusive, mandatory, password-protected log-in mechanism geared to security-obsessed network installations.

The best programs use a suite of schemes to track down viruses. Each type of scanning—string searching, file signature checking,

Safe Computing

Even if you buy and use several top-flight antivirus applications, your best defense is to avoid infection in the first place. There's no absolute guarantee against infection, but you can minimize the risk to your own and others' computers by following these straightforward guidelines:

1 Back up regularly—a full backup once a week, with incremental backups daily if necessary. Uninfected backups let you simply overwrite infected files, but even infected backups let you recover from logic bombs—just remember to disinfect restored files right away.

2 Write-protect and back up installation disks before installing new software. If you don't and your computer is already infected with a virus, the original program disks could become permanently infected during installation.

3 Scan any network drives you regularly use. And don't forget that files attached to E-mail messages may be infected.

4 Write-protect floppies when booting from them or copying their files to your hard disk. You'll avoid transferring a virus from your hard disk to the floppy, which could later infect someone else's system or reinfect yours.

5 Don't boot your computer with a floppy disk that you haven't scanned and disinfected first.

6 Scan any programs downloaded from a BBS or copied from a floppy or a network drive before launching them. Most BBS's scan uploads before making them available for downloading, but you're trusting your SYSOP, and your SYSOP's choice of virus detection software, when you download.

7 Use the memory-resident virus-spotting portion of your antivirus application at all times. If you suspect an infection, turn off your computer immediately, reboot from a clean floppy (one without an AUTOEXEC.BAT or a CONFIG.SYS file), and then disinfect the system using a disk-based copy of your antivirus program.

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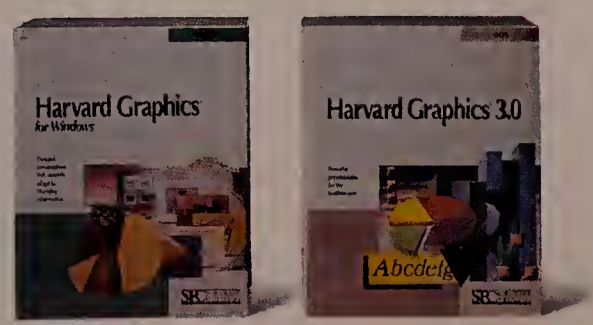

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and viral activity detection—has its strengths and weaknesses, so programs that employ all three are the likeliest to catch every bit of criminal code that sneaks onto your system. With the exception of *Virus Alert*, all these applications use some form of all three techniques, with varying amounts of success.

Infection and Cure

Although no program detected and removed every virus while also preventing the infection of other files, *Virus Prevention Plus* provided the best defense against the test suite, followed closely by *Dr. Solomon's Anti-Virus Toolkit*, *Virex*, and *Norton AntiVirus*. Although they didn't score as well overall, *Vi-Spy* and *Central Point Anti-Virus* deserve special mention for preventing every one of the test viruses from infecting other files. *ViruScan/Clean-Up/VShield* and *VirusNet* detected every infected file. The remaining programs mostly did well at rooting out common viruses.

Whatever antiviral methods a program employs, it should let you scan boot sectors and partition tables, give you the choice of scanning all files or just executable program files, and scan from the floppy drive (both for convenience and to prevent infection of the antivirus program). Data file infectors, though not unknown, are extremely rare, and scanning only program files shortens the process considerably. All the programs here offer these scanning features, but they differ in their additional capabilities.

18 Antivirus Programs Cover Almost Every Angle

● = Yes ○ = No n/a = not applicable Best Buy

Product	Company	Price	DETECTION AND REMOVAL: Scans executable files only	Scans all files	Scans conventional memory	Scans upper memory	Scans HMA memory	Scans boot sector, partition table	Backs up boot sector, partition table to disk
AntiVirusPlus	**Techmar Computer Products** 800/922-0015, 718/997-6666	$99.95	●	●	●	●	○	●	●
Central Point Anti-Virus W	**Central Point Software** 800/445-4208, 503/690-8090	$129	●	●	●	○	○	●	●
Data Physician Plus	**Digital Dispatch** 800/221-8091, 612/436-1000	$49	●	●	●	●	○	●	●
Detect Plus	**Commcrypt** 800/334-8338, 301/470-2500	$129	●	●	●	●	○	●	●
Dr. Solomon's Anti-Virus Toolkit W	**Ontrack Computer Systems** 800/752-1333, 612/937-1107	DOS $149.95, DOS and Windows $195	●	●	●	●	●	●	●
Norton AntiVirus W	**Symantec** 800/441-7234, 408/252-3570	$129	●	●	●	●	●	●	●
Novi	**Symantec** 800/441-7234, 408/252-3570	$129	●	●	●	●	●	●	○
PC Rx W	**Trend Micro Devices** 800/228-5651, 310/328-5892 (fax)	$69	●	●	●	○	○	●	●
Pro-Scan	**McAfee Associates** 408/988-3832, 408/988-4004 (BBS)	$89.95	●	●	●	●	●	●	○
Untouchable	**Fifth Generation Systems** 800/873-4384, 504/291-7221	$99	●	●	●	○	○	●	○
Virex	**Datawatch** 508/988-9700, 508/988-0672 (fax)	$49.95	●	●	●	●	○	●	●
ViruCide Plus	**Parsons Technology** 800/223-6925, 319/395-9626	$69	●	●	●	●	○	●	●
Virus Alert	**Look Software** 613/837-2151, 613/837-5572 (fax)	$39.95	●	●	●	○	○	●	○
Virus Buster W	**Leprechaun Software** 800/521-8849, 404/971-8900	$129	●	●	●	○	○	●	●[7]
ViruScan, Clean-Up, VShield	**McAfee Associates** 408/988-3832, 408/988-4004 (BBS)	$25, $35, $25[8]	●	●	●	●	●	●	●
VirusNet	**Safetynet Software** 800/851-0188, 201/467-1024	$49	●	●	●	●	●	●	○
Virus Prevention Plus W	**PC Guardian** 800/288-8126, 415/459-0190	$125	●	●	●	●	●	●	●
Vi-Spy W	**RG Software Systems** 602/423-8000, 602/423-8389 (fax)	$149.95	●	●	●	●	●	●	●[7]

W Windows version available.
[1] By checking changes to file signatures/checksums.
[2] Executable files only.
[3] Entire hard disk.
[4] First year free.
[5] Requires expanded memory.
[6] Available in upcoming version.
[7] Requires difficult procedure.

Because of the sensitive nature of your hard disk's partition table and boot sector, just checking them for viruses is not enough. Antivirus applications should be able to prevent programs from writing to the boot sector and partition table, foiling even the stealthiest boot-sector virus. Some programs go even further by creating file signatures of partition table and boot sector data, storing them on the hard disk, and helping you recover easily from viruses that haven't yet made their presence known. This recovery technique is powerless, however, against a virus like the Grand York File, which immediately makes the hard disk unreadable. The best programs prompt you to create a recovery disk containing a backup of the hard disk boot data and later help you restore that data. Two programs, *Vi-Spy* and *Virus Buster*, create the backup files, but only the documentation tells you to copy them to a floppy disk.

As new viruses appear, you must update your program's database of viruses and known strings. With estimates that three new viruses appear each day, you should look for a program from a company that offers frequent updates—the best companies offer them monthly. Updates usually cost money, so when choosing a program that offers them, add that cost to the purchase price. Don't forget to consider how updates are delivered. You're better off with a company that lets you choose between receiving a disk by mail and downloading files from a BBS. Downloading may be quicker if you suspect you've been struck by a new virus and need an update right away.

			PREVENTION									
Scans from floppy drive	Creates log file	Maximum/minimum TSR RAM required (K)	TSR runs in upper memory	Tries to block viruses from memory	Checks for unknown viruses	Prevents boot sector, partition table writes	Write-protects files	Network compatible	Frequency/annual price of updates	Update method	Reader service number
●	●	31/7	●	●	●	●	●	●	quarterly/$29	disk	638
●	●	22/8	●	●	●[1]	●	●[2]	●	monthly/free via BBS quarterly/$79 on disk	BBS, CompuServe, disk	639
●	●	47/12	●	●	●[1]	●	●[2]	●	quarterly/$15 via BBS, $30 on disk	BBS, disk	640
●	●	26.3/26.3	●	●	●[1]	○	○	●	quarterly/$29	BBS, disk	641
●	●	6.4/6.3	●	●	●[1]	●	●[3]	●	monthly/$195 quarterly/$65	disk	642
●	●	40/2	●	●	●[1]	●	●	●	quarterly/$69	BBS, CompuServe, disk, fax	643
●	●	30/30	●	●	●	●	○	●	n/a	n/a	643
●	●	12/9	●	●	●	●	●	●	monthly/free via BBS, $5 per disk[4]	BBS, CompuServe, disk	644
●	●	6.3/6.3	●	○	●[1]	○	○	●	quarterly/$55	disk	645
●	●	5/1	●[5]	●	●[1]	○	○	●	monthly/free via BBS quarterly/$60 on disk	BBS, CompuServe, disk	646
●	●	40/1	●	●	●[1]	○	●	●	quarterly/$50[4]	BBS, disk	647
●	●	31/23	●	●	●	●	○	●	quarterly/$12 per disk	disk	648
●	●	15/2	●	●	●	○[6]	○	●	bimonthly/$80	disk	649
●	●	11.3/4.4	●	●	●	●	●	●	monthly/$50	BBS, disk	650
●	●	40/6	●	●	●	●	○	●	monthly/free	BBS, CompuServe	645
●	●	13.4/13.4	●	●	●	○	○	●	monthly/$25	BBS	652
●	●	21/7.4	●	●	●	●	●[2]	●	quarterly/free via BBS, $37.50 on disk[4]	BBS, CompuServe, disk	651
●	●	79/5	●	●	●[1]	●	○	●	quarterly/$99.95[4]	BBS, disk	653

[8] Home use registration fee.

For more information about all products in this table, circle reader service no. 900.

You may forget to check for updates at other times, though, and are likely to promptly install an update disk that you get by mail.

Only one program, *Novi*, whose manufacturer was recently acquired by Symantec, doesn't offer upgrades. Instead it relies on other virus detection techniques, though it does use signature scanning. A Symantec spokesperson said the company will likely merge *Novi* with *Norton AntiVirus* in upcoming versions.

Get Well Soon

The majority of these programs performed decently, but *Norton AntiVirus* is our choice for Best Buy, thanks to a smooth, no-surprises interface, excellent virus detection and prevention performance, and a complete set of features. Runners-up *Virex* and *Dr. Solomon's Anti-Virus Toolkit* each did well overall, particularly when it came to finding and destroying our test viruses, but they didn't do quite as well in other areas. *Virex* was fairly inept at disinfecting files—only *PC Rx* did worse. *Dr. Solomon*'s repair menu command simply didn't work, and the program's monthly upgrades are expensive compared with its competitors'. *Virus Prevention Plus* was the top test-virus exterminator, but you have to put up with its authoritarian log-in security system, which may be overkill even for small LANs.

Even though they collectively got low marks for their almost total lack of a user interface, McAfee Associates' shareware programs *ViruScan*, *Clean-Up*, and *VShield* would make an excellent backup for another antivirus program.

You don't have to buy an antivirus product to reduce your risk of being bitten by a virus, but one of the top programs will save you a lot of time and trouble in the long run. Combined with regular backups and awareness about how to avoid viruses in the first place, your chances of losing productivity—and sleep—will be minimal.

Scott Spanbauer is a contributing editor for PC World. *He can be reached as SCOOTSPAN on PC World Online (see page 10 for more information).*

TEST REPORT

Antivirus Programs Battle 13 Viruses

	Detection		Removal		Prevention	
	Out of 8 common	Out of 5 uncommon	Out of 8 common	Out of 5 uncommon	Out of 8 common	Out of 5 uncommon
AntiVirusPlus	8	5	8	0	8	1
Central Point Anti-Virus	8	1	7	1	8	5
Data Physician Plus	7	3	7	3	8	4
Detect Plus	7	3	7	3	8	4
Dr. Solomon's Anti-Virus Toolkit	8	5	8	2	8	4
Norton AntiVirus*	8	4	7	1	8	5
Novi	8	2	7	0	8	3
PC Rx	8	4	2	0	8	4
Pro-Scan	8	5	8	1	0	0
Untouchable	8	4	7	0	8	3
Virex	8	5	6	0	8	5
ViruCide Plus	8	4	8	0	8	3
Virus Alert	8	5	8	1	8	2
Virus Buster	8	4	8	2	8	1
ViruScan, Clean-Up, VShield	8	5	8	0	8	3
VirusNet	8	5	8	1	8	2
Virus Prevention Plus	8	5	8	1	8	5
Vi-Spy	8	2	7	3	8	5

*Best Buy

Methodology
We tested antivirus programs using 13 viruses provided by the National Computer Security Association. Eight are common file infectors: Cascade 1701, Cascade 1704, Jerusalem (standard), Green Caterpillar (a.k.a. 1575 and 1591), Yankee Doodle, Frodo (a.k.a. 4096—both COM and EXE versions), and Dark Avenger. The other 5 are uncommon and more difficult to detect: Dedicate, Groove, Hilton (a.k.a. Grand York File), Mummy, and Twin-351. Most of the test viruses employ stealth or mutation techniques to avoid detection. The Detection test measures how many of the 13 test viruses an antivirus program finds. The Removal test measures from how many infected files the antivirus program successfully removes each of the test viruses. The Prevention test measures how many test viruses each antivirus program prevents from infecting other files—but doesn't determine whether system memory was infected.

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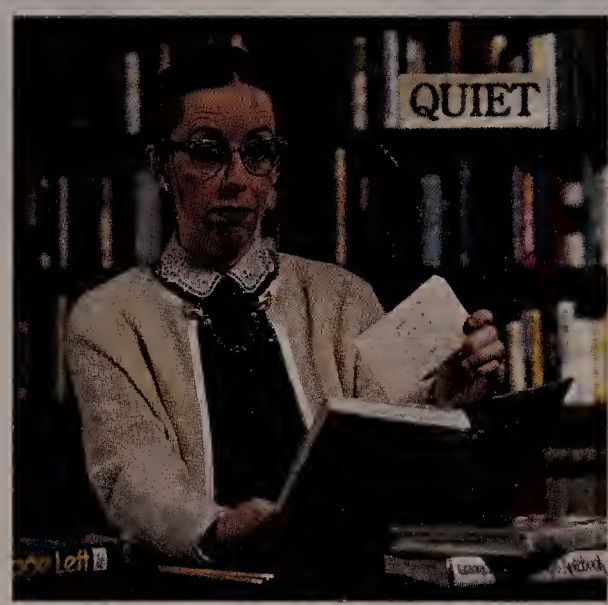

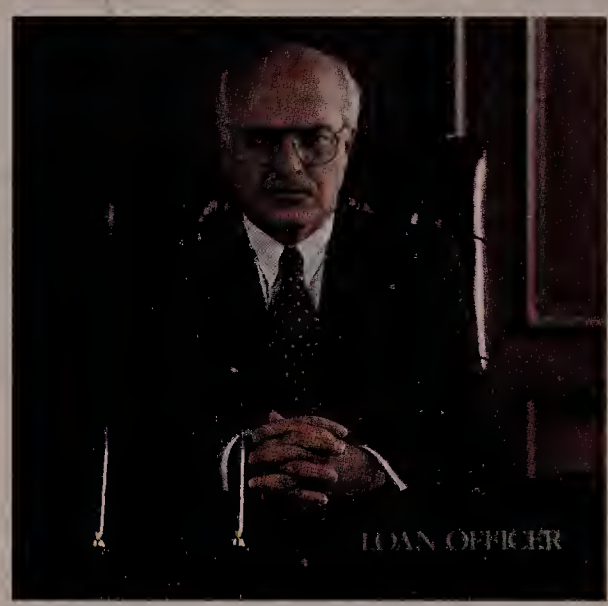

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11036 PhotoStyler Win. Comp. Upgrd. *(11037 3½")*.. 189.
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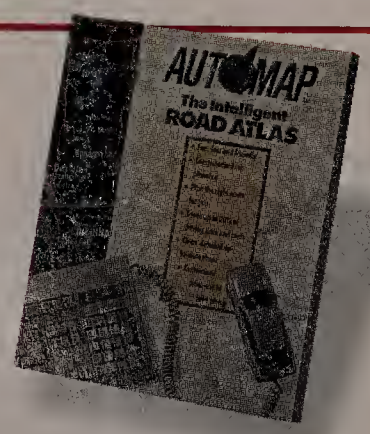

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11312 Baler 6.0 ..... 279.
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5506 CorelDRAW! 3.0 *(5508 3½")* ..... 395.
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7303 OS/2 2.0 Upgrade from DOS *(7305 3½")* ..... 99.
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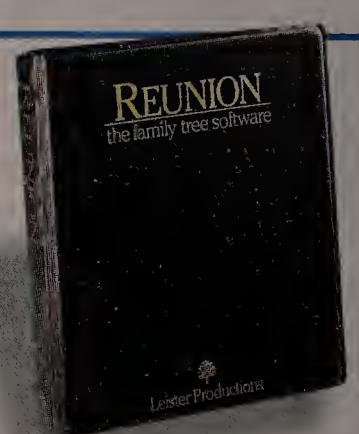

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5883 FaxWorks 2.5 *(Windows & DOS) (3½" only)* ..... 45.
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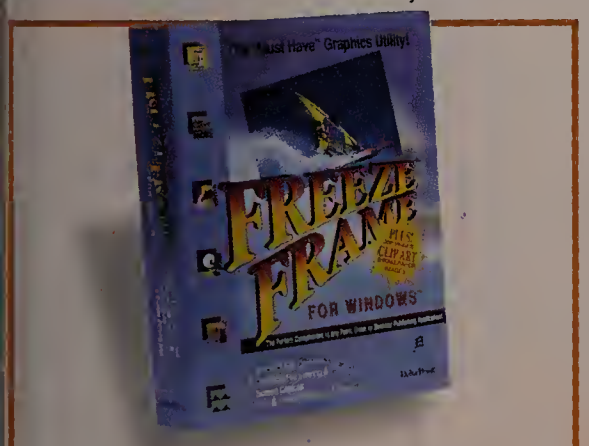

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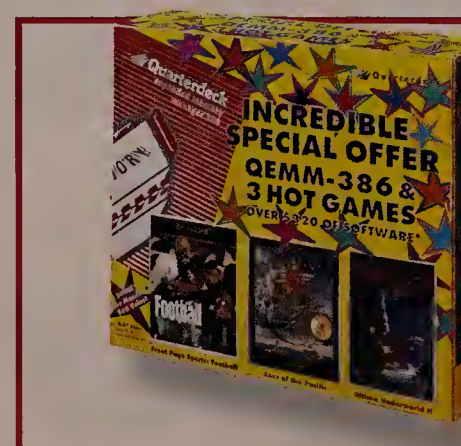

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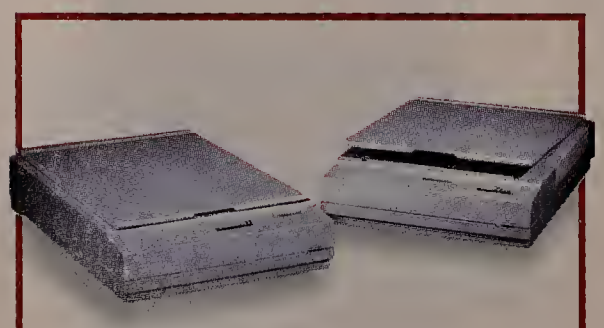

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5416 1-2-3/ DOS Release 3.4.....399.
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5799 AmiPro for Windows.....239.
5005 Freelance for Windows.....349.
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Crystal-Clear Resolution. Any Time. Any Place.

The LTE Lite is the ultimate in notebook technology—winner of a *PC Magazine* Editors' Choice Award and *PC User Magazine* Gold Award (3/10/92). With its dazzling VGA display and the unique EasyPoint Trackball, this compact 6.4 lb. powerhouse is the perfect choice for people who don't want to sacrifice performance when they go on the road.

LTE Lite 3/25c (Color)

25 MHz 386SL; 4 MB expandable to 20 MB

9553 **Model 120/w** 120 MB Hard Drive **$3499**
9554 **Model 84/w** 84 MB Hard Drive $2929

LTE Lite 3/25e

25 MHz 486SL; 4 MB expandable to 20 MB

11590 **Model 120/w** 120 MB Hard Drive **$2999**
11589 **Model 84/w** 84 MB Hard Drive $2849

LTE Lite Features:

- **3/25c:** 8.4" Active Matrix Color VGA display with 640 x 480 capability (256 colors from a palette of 4,096)
- **3/25e:** Matrix B&W 9.5" VGA display upgradable to Active Matrix Color VGA display
- 3.5" 1.44 MB floppy
- 79/80-key keyboard with isolated, inverted "T" cursor keys
- Built-in EasyPoint Trackball
- NiMH Power Smart Pack with 3-4 hour life
- MS-DOS 5.0 and Windows 3.1

Additional Hardware/Accessories*
No additional charge for installation (where required)

6569	Intel Math CoProcessor 80387SL	$79
1073	Colorado Trakker 250 Tape Backup (parallel)	429
10757	Kingston 2 MB memory upgrade	159
10758	Kingston 4 MB memory upgrade	189
10759	Kingston 8 MB memory upgrade	375
10517	Megahertz 2400 data, 9600 S/R fax (int.)	215
10518	Megahertz 9600 data, 9600 S/R fax (int.)	479
10515	Megahertz 14,400 data, 14,400 S/R fax (int.)	499
10671	Compaq NiMH Battery	187
10670	Compaq NiCd Battery	121
10662	Compaq Auto Adapter	93
10664	Compaq External Battery Charger	87
10672	Compaq Quick Connect	79
10665	Compaq Desktop Expansion	599
7060	Kensington MicroSaver (security device)	39

Note: All Compaq hardware options (drives, modems, etc.) are also available from us. Call for more information.

PC CONNECTION COMPAQ HOTLINE 800-998-0003

Circle 180 on reader service card

timedia enliven encyclopedias, electronic maps, and training applications. The space needed to store font descriptions or audio data will quickly overwhelm the capacity of floppies and hard disks but not CD ROMs.

The only downside to CD ROM drives is that they are slower than hard drives. This buyers' guide includes CD ROM drives with average access times of 550ms or less to make practical use of video, graphics, and sound—anything longer is too slow. Unless you plan to use your CD ROM drive only for text-based reference applications, don't even consider a slower drive.

Larry Shiller, president of the Bureau of Electronic Publishing, predicts that within the next two years some software will be shipped exclusively on CD ROM. Increasingly, software vendors are distributing weightier applications and their accompanying technical manuals on CD ROM, exchanging a suitcase full of floppies and documentation for one modest piece of plastic. The complex graphics and fonts in *CorelDraw*, for instance, are available on CD ROM. Microsoft publishes a version of *Word for Windows* on CD ROM with the company's *Bookshelf* reference work. Search and copy features make it a snap to drop references straight into your documents.

The CD ROM Frontier

Two new developments promise you'll see even more of CD ROM in the years to come. The Photo CD technology from Kodak brings high-resolution photographic images to your desktop on a medium that is less cumbersome and more environmentally sound than paper photos. CD ROM recorders (CD-R) have finally descended to price levels below $10,000, meaning that the average corporation can afford to record small runs of disks.

The ability to concentrate technical manuals, design specifications, or a roomful of legal archives onto one disk promises to streamline the dissemination of information for many companies burdened by too much paper. For all these reasons, CD ROMs' penetration into the business world is likely to grow rapidly.

The price of CD ROM drives ranges widely, from $200 to $900 or more on the street. In most cases the price is proportional to the drive's quality and capability. If you have an externally accessible 5¼-inch drive bay free, you can save about $100 as well as desktop space by choosing an internal model. Your primary concern, however, should be a drive's speed.

CD ROM Drives

● = Yes ○ = No
n/a = not applicable

Manufacturer	Product	PRICING: Internal model	PRICING: External model	PRICING: Parallel-connected model	PRICING: List price adapter kit[1]	INTERFACE: Adapter type[2]	INTERFACE: Adapter make and model
CD Technology 408/752-8500	CD Porta-Drive T-3401	$700	$850	$1100	$200 $250	SCSI SCSI	Future Domain TMC-850M Future Domain TMC-1650
CD ROM 800/821-5245, 303/231-9373	CRI-1000e (ext), CRI-1000i (int) CRI-1000 AT	$299 $299	$399 $349	$549[4] n/a	included included	SCSI proprietary	Future Domain TMC-950 n/a
Chinon America 800/441-0222, 310/533-0274	435 Series 535 Series	$495 $695	$645 $795	n/a n/a	included $100	SCSI SCSI	Chinon CDS-311 NCS-250-SC
Consan Storage Solutions 800/229-3475, 612/949-0053	3401XT	$645	$795	n/a	$160	SCSI	Adaptec AHA-1510
Hitachi Home Electronics 800/369-0422, 310/537-8383	CDR-1700SMAX CDR-1750S CDR-3700 CDR-3750	n/a n/a $745 $865	$815 $915 n/a n/a	n/a $1185 n/a n/a	$70 $180, $260 (MCA) $70 $180	proprietary SCSI proprietary SCSI	Hitachi CDIFI8S Future Domain TMC-850 Hitachi CDIFI8S Future Domain TMC-850
Insight Distribution Network 800/927-7848, 602/902-1010	Talon TA-100 Talon TA-150 Talon TA-200	$269 $299 $449	n/a n/a n/a	n/a n/a n/a	included included included	proprietary proprietary SCSI	Mitsumi CRMC-LU LMSI CM-205 NEC 84J
Liberty Systems 408/983-1127	115 Series	n/a	$699	$799	$89 (SCSI)	SCSI parallel–SCSI	Trantor T130 (SCSI) Trantor T348PL
MacProducts USA 800/622-3475, 512/472-8881	Magic CD ROM 3401	n/a	$599	n/a	$119	SCSI	Trantor T130
Micro Design Int'l 407/677-8333	LaserBank 600CDX	$795	$895	n/a	included[9]	[10]	[10]
Micro Solutions Computer Products 815/756-3411	CD-ROM Backpack	n/a	n/a	$499	n/a	parallel–SCSI	n/a
Mitsumi Electronics Available via retail, distributors, and mail order.	CRMC-LU005S CRMC-FX001	$249[11] $299[11]	n/a n/a	n/a n/a	included included	SCSI SCSI	proprietary proprietary

[1] Kit includes all necessary software and cables.
[2] "SCSI" encompasses SCSI-1 and SCSI-2 PC interfaces.
[3] Future Domain MCS-600 adapter, $300, works with external model.
[4] Trantor T338 adapter works with external model.
[5] $199 extra.
[6] Drive runs at 150 K/sec for audio and 300 K/sec for data.
[7] CDR-1700SMC Micro Channel CD ROM drive $1095.
[8] MCS-600 adapter, $260, works with external model.
[9] Various models available.

Two factors affect the rate at which a CD ROM drive delivers information from a CD ROM disk: its data transfer rate (the speed at which the information is shuttled from the CD ROM to your system's memory), and average access time (the time it takes to retrieve a random piece of information from the disk).

To the Swiftest Go the Spoils

Of the two factors, the data transfer rate is most important. This is particularly true for multimedia applications, which lay down data in contiguous files that need to be pumped through to the screen as quickly as possible. The standard data transfer rate for CD ROM drives is 150 K/sec (kilobytes per second). Drives incorporating the new double-speed technology spin the disk twice as fast and, according to vendors, achieve transfer rates of 300 K/sec and faster.

Access time matters most to applications such as databases, which have to retrieve information from several noncontiguous sections of the disk. But faster is always better. You'll see access times as low as 200ms on some double-speed drives.

The speed at which you retrieve information from the drive will also depend on the size of its buffer. Ranging from 32K to 256K from drive to drive, buffers can make up for the slowness of a drive by storing more information than the application asked for, making that information more readily available when it's needed.

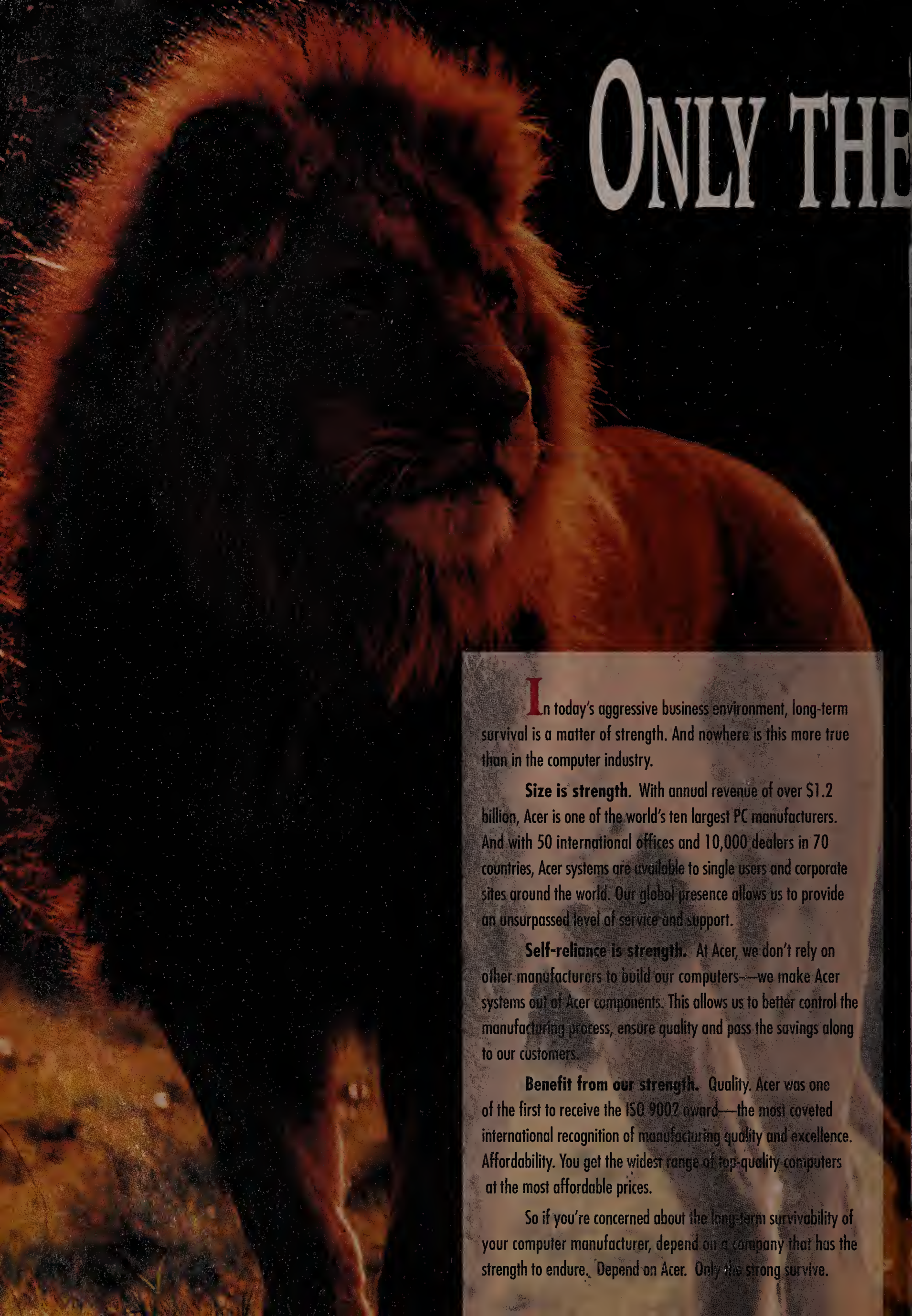
You'll notice most CD ROM drives either bear the Multimedia PC Marketing Council's MPC logo or claim to meet the MPC specifications for multimedia hardware. Don't expect the logo to guarantee you the ability to run full-motion video applications, however, as the MPC council's requirements are ridiculously easy to meet. In fact, it's hard to find a drive on the market today that doesn't have at least a 1000ms average access time and a stated 150 K/sec sustained data transfer rate.

Our past testing experience indicates that if you want optimum performance with multimedia applications, you should buy the fastest drive you can afford. So we eliminated any drives with a stated average access time over 550ms for this guide. If you're serious about running motion-video applications, seek a drive with an average access rating from 200ms to 350ms. And buy one of the new double-speed drives to take advantage of the tremendously enhanced sequential transfer rates that these units provide.

	SPEED			ACCESSORIES									
Micro Channel bus interface	Sequential transfer rate (K/sec)	Average random access time (ms)	Built-in buffer (K)	Supports Photo CD	Daisy-chain drives	Automatic lens cleaning mechanism	Dust protection door	Eject button	Software eject	Emergency eject	Uses disk caddy	Warranty (months)	Reader service number
●[3]	330	200	256	●	●	●	●	●	●	●	●	24	610
●[5]	153.6	350	64	●	●	●	●	●	○	●	●	12	611
○	153.6	350	64	○	●	●	●	●	○	●	●	12	611
○	150[6]	350	64	●	●	○	○	●	●	●	●	12	612
○	150	350	64	●	●	○	○	●	●	●	●	12	612
●	330	200	256	●	●	●	●	●	●	●	●	12	613
●[7]	150	300	128	●	●	●	●	●	●	●	●	12	614
●[8]	150	300	64	●	●	●	●	●	●	●	●	12	614
○	150	300	64	●	●	●	●	●	●	●	●	24	614
○	150	300	64	●	●	●	●	●	●	●	●	24	614
○	150	380	32	●	○	○	○	○	○	○	○	12	615
○	150	375	32	●	○	○	○	●	●	○	○	12	615
○	300	280	64	●	○	○	●	●	○	●	●	12	615
●	330	200	256	●	●	●	●	●	●	●	●	12	616
●	360	200	256	●	●	●	●	●	●	●	●	12	617
●	327	200	256	●	●	●	●	●	●	●	●	12	618
●	150	350	128	●	●	○	●	○	○	○	○	12	619
○	150	350	32	●	○	○	●	○	○	○[12]	○	12	
○	150	280	32	●	○	○	●	●	●	●	○	12	

[10] Adapter prices vary from $195 for DOS-only to $795 for 32-bit MCA.
[11] Estimated street price.
[12] Manual eject tray.

Table continues on following pages.



ONLY THE

In today's aggressive business environment, long-term survival is a matter of strength. And nowhere is this more true than in the computer industry.

Size is strength. With annual revenue of over $1.2 billion, Acer is one of the world's ten largest PC manufacturers. And with 50 international offices and 10,000 dealers in 70 countries, Acer systems are available to single users and corporate sites around the world. Our global presence allows us to provide an unsurpassed level of service and support.

Self-reliance is strength. At Acer, we don't rely on other manufacturers to build our computers—we make Acer systems out of Acer components. This allows us to better control the manufacturing process, ensure quality and pass the savings along to our customers.

Benefit from our strength. Quality. Acer was one of the first to receive the ISO 9002 award—the most coveted international recognition of manufacturing quality and excellence. Affordability. You get the widest range of top-quality computers at the most affordable prices.

So if you're concerned about the long-term survivability of your computer manufacturer, depend on a company that has the strength to endure. Depend on Acer. Only the strong survive.

STRONG SURVIVE

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" THE QUEST FOR
THE BEST PC"
Feb. 1993

"Performance that tops that of other DX2/50s and rivals that of some of the 66MHz 486DX2s."

"Although we see great equipment every day, this PC is the kind of system we'd go out and purchase for ourselves..."

"This Best Buy came up with the combination of performance, price, expandability and design it takes to deserve first place among 25 systems..." – PC World *February, 1993*

"Needless to say the (AcerPower 486e) took first place in every test." – PC World *January, 1993*

Based on 33, 50 and 66MHz Intel® processors, AcerPower™ delivers plenty of speed and performance for today's demanding Windows™ applications. But don't take our word for it—pick up the February issue of PC World and find out why the AcerPower 486e DX2/50 is a Best Buy.

FEATURES	MODEL 5367	MODEL 5567	MODEL 5667
CPU	486DX/33	486DX2/50	486DX2/66
MEMORY	4MB, Exp. to 256MB	4MB, Exp. to 256MB	4MB, Exp. to 256MB
CACHE	128K	128K	128K
HARD DISK	240MB	240MB	240MB
FLOPPY	3 1/2"	3 1/2"	3 1/2"
ACCEL. VIDEO	Local Bus (1280 x 1024)	Local Bus (1280 x 1024)	Local Bus (1280 x 1024)
I/O	EISA	EISA	EISA
MONITOR	15" NI EVGA .28 Flat Square Overscan	15" NI EVGA .28 Flat Square Overscan	15" NI EVGA .28 Flat Square Overscan
SOFTWARE	DOS®, Windows™	DOS, Windows	DOS, Windows
WARRANTY	One Year On-site	One Year On-site	One Year On-site
MSRP	$2,599	$2,799	$2,999

ONLY THE STRONG SURVIVE

Call 1-800-SEE ACER for a dealer or retailer near you

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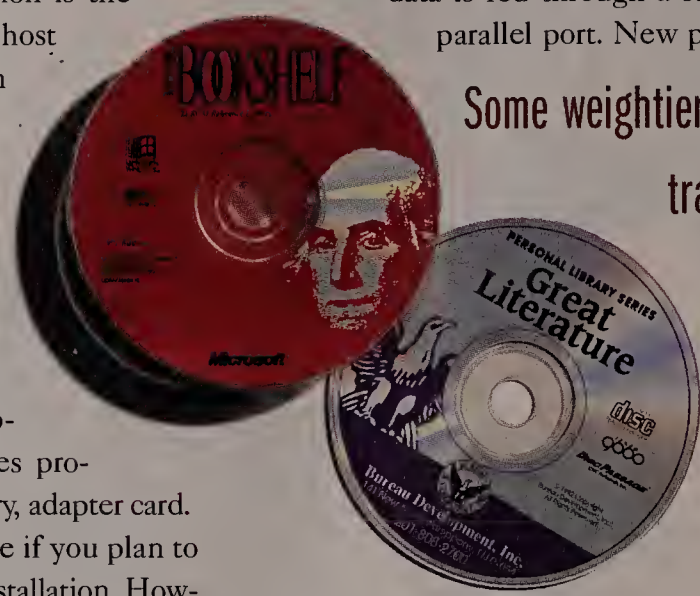
Circle 54 on reader service card

Hooking It Up

CD ROM drive interfaces come in a variety of forms. The most common is the standard 8- or 16-bit SCSI host adapter, which fits in an expansion slot on your computer. While 16-bit adapters can provide up to 10 percent greater throughput, standard 8-bit adapters are adequate for virtually all the currently available multimedia applications. Some companies provide a similar, but proprietary, adapter card.

Standard adapters are fine if you plan to make a single, stationary installation. However, if you want to hook up to a notebook PC or move your drive from computer to computer, you'll want a parallel-to-SCSI adapter. This card plugs into your parallel port with a pass-through for your printer.

You'll notice slower transfer rates when data is fed through a standard parallel port. New parallel-to-SCSI converters, such as Trantor Systems' MiniSCSI EPP, also work with the enhanced parallel ports found on notebooks from vendors such as Compaq, Dell, and others to provide transfer rates comparable to those of a standard 8-bit SCSI host adapter. If you use a Micro Channel machine, you'll need to find a drive that provides a Micro Channel adapter. Not all vendors offer that option, however.



Some weightier software will be shipped only on CD ROM, transforming a suitcase full of floppies and manuals into one modest piece of plastic.

Spending money for a newer, faster drive brings additional advantages if you're interested in Kodak's new Photo CDs. These CDs store high-quality digital versions of your photos. (You must send the negatives to Kodak for recording.) Also, Photo CD promises integrated motion and sound.

The disk's images are stored in a new for-

CD ROM Drives (continued)

●= Yes ○= No
n/a = not applicable

Manufacturer	Product	PRICING: Internal model	PRICING: External model	PRICING: Parallel-connected model	PRICING: List price adapter kit[1]	INTERFACE: Adapter type[2]	INTERFACE: Adapter make and model
NEC Technologies 800/388-8888, 708/860-9500	MultiSpin 74 (ext), MultiSpin 84 (int)	$550	$615	n/a	$80 (SCSI), $95 (parallel)	SCSI	Trantor T130
	MultiSpin 38	n/a	$465	$465	$80 (SCSI), $95 (parallel)	SCSI	Trantor T130
Parallel Peripherals 800/864-3016, 714/394-7244	5.25" External CD ROM	n/a	n/a	$749	included	parallel–SCSI	n/a
Peripheral Land 800/288-8754, 510/657-2211	PLI CD-ROM MS200	$843	$969	n/a	$223	SCSI	PC QuickSCSI
Philips Consumer Electronics 800/835-3506	CM405ABK (int), CM425ABK (ext)	$699	$749	n/a	included	SCSI	n/a
	CM205XBK	$499	n/a	n/a	included	proprietory	Philips cm 250
Procom Technology 800/800-8600, 714/852-1000	MCD-DS (ext), SiCD-DS (int)	$645	$645	$645	[3]	SCSI	proprietary
	PxCDS (ext), PiCDS (int)	$345	$345	$345	included	proprietary	proprietary
Relax Technology 510/471-6112	Vista I Texel DM 3024	$499	$499	$499	included	SCSI	Trantor T130
	Vista II Toshiba XM3401	$549	$549	$549	included	SCSI	Trantor T130
Sony Corporation of America 800/352-7669, 408/432-0190	Sony Desktop Library	$850[4]	$1070	n/a	included	SCSI	proprietary
	CDU-561	n/a[5]	n/a	n/a	included	SCSI	Future Domain TMC-850
Storage Devices 800/872-7341, 714/562-5500	SCD-683X	n/a	n/a	$849	included	parallel–SCSI	proprietary
Sun Moon Star 408/452-7811	SCSI CD-ROM Kit/541	$579	$579	$579	included	SCSI	Data Technology DTC-3150
	Laser CD-ROM Set/31A	$499	$499	$499	included	proprietary	Sun Moon Star CDB-31A
Tandy 817/390-3011	CDR-1100	$400	$400	$400	included	proprietary	proprietary
Texel 800/886-3935, 408/980-1838	DM-3024	$499	$499	$499	$100	SCSI	Trantor T130
	DM-5024	$599	$599	n/a	$100	SCSI	Trantor T130
Toshiba America Information Systems 714/583-3111	XM-3401 Series	$695	$695	$695	PCF Kit: $150	SCSI	Future Domain TMC-850

[1] Kit includes all software and cables necessary to install and use the adapter.
[2] "SCSI" encompasses SCSI-1 and SCSI-2 PC interfaces.
[3] Adapters vary, and prices range from $95 to $355.
[4] Starter kit bundle $500.
[5] Not available at press time.
[6] External only.

mat, so you'll need new or updated software to view them. Also, while most of the drives here can read Photo CD disks, not all can read beyond the first recording. Regular CD ROM disks are the product of one recording session, but additional recording sessions can add photos to Photo CDs. Buying a "multisession" CD ROM drive solves the problem. If you would like to keep up with Photo CD developments, find out how completely your drive fits the bill.

Reliability and Convenience

Look for certain service and convenience features on your CD ROM drive. A warranty longer than 12 months carries more weight than the vendor's MTBF (mean time between failures) claim. The more disk removal options you have—an eject button, software eject, emergency eject—the better. Maintenance features such as an automatic lens cleaning mechanism or a dust protection door help protect the drive from the elements. In the absence of maintenance features, a drive that uses a disk caddy also helps keep dirt away from the CD ROM's delicate innards.

The ability to daisy-chain drives means that you can hook up several CD ROM drives from the same adapter, an important feature if you need access to more than one disk at a time. For CD ROM applications that incorporate sound, you'll want standard audio output jacks, volume control, and audio software, found in most models.

The Time Is Right for CD ROM

CD ROM drives have been around for a long time, but only recently have they emerged as an undeniable asset to your business. Consider the cornucopia of software from databases to reference works to desktop publishing. And while software has caught up to hardware in its availability and variety, the speed of the hardware has increased. Toshiba America's XM-3401 Series CD ROM drives, for instance, give you state-of-the-art double-speed, multisession capabilities, making them ready for use with any application that's available on the market today.

Looking toward tomorrow, the advent of affordable hardware for creating CD ROM in house means that the storage and retrieval advantages of the medium can be harnessed by the business world. With the promise of more and more information available on CD ROM, the future looks as shiny as the disks themselves.

Melissa Riofrio is an assistant editor for PC World. *She can be reached on PC World Online (see page 10 for more information).*

	SPEED			ACCESSORIES									
Micro Channel bus interface	Sequential transfer rate (K/sec)	Average random access time (ms)	Built-in buffer (K)	Supports Photo CD	Daisy-chain drives	Automatic lens cleaning mechanism	Dust protection door	Eject button	Software eject	Emergency eject	Uses disk caddy	Warranty (months)	Reader service number
●	300	280	256	●	●	●	●	●	○	○	●	24	620
●	300	400	64	●	●	○	○	○	○	○	○	24	620
●	150	350	64	●	○	●	●	●	●	●	●	12	621
●	330	200	256	●	●	●	●	●	○	●	●	12	622
● ○	300 153.6	265 375	64 32	● ○	● ○	● ●	● ○	● ○	○ ●	○ ○	● ○	12 12	623 623
● ●	330 150	200 490	254 64	● ●	● ○	● ●	● ●	● ●	● ●	● ●	○ ○	24 12	624 624
● ●	150 330	325 200	64 256	● ●	● ●	● ●	● ●	● ●	● ●	● ●	● ●	12 12	625 625
○ ○	150 300	550 280	64 256	● ●	○ ●	● ●	● ●	● ●	● ●	● ●	○ ●	12 12	626 626
○	300	280	256	●	●	●	●	●	●	●	●	12	627
○ ○	150 150	380 490	64 64	● ●	● ●[6]	● ○	● ●	● ●	● ○	● ●	● ○	12 12	628 628
○	153.6	375	32	○	○	○	○	○	○	○	○	12	629
● ●	300 300	265 265	64 64	● ●	● ●	● ●	● ●	● ●	○ ○	○ ○	● ●	12 12	630 630
●[7]	330	200	256	●	●	●	●	●	●	●	●	12	631

[7] PS/2 kit with Future Domain MCS-600 adapter lists for $300.

For more information about all products in this table, circle reader service no. 901.

Operate at a

Run DOS applications. Run Windows™ applications. Run OS/2® applications. Run them at the same time, in separate windows on the same screen. With OS/2, you can experience a whole new level of freedom and flexibility.

Drag a file object from one folder and drop it in another to move it. Drag a folder object and drop it on the shredder to delete it. Drag a file object and drop it on the printer to print it. In the OS/2 Workplace Shell,™ common procedures become intuitive clicks of a mouse.

DOS and Windows support is built in to OS/2, and you can explore over 1,000 OS/2 applications as well.

Copy text from DOS applications into Windows or OS/2. Or from anywhere to anywhere. Use Dynamic Data Exchange within or between OS/2 and Windows applications. Repaginate a Word for Windows document while printing a Harvard Graphics® chart while calculating a 1-2-3® spreadsheet while downloading files via modem. Instead of calling a file "boblettr.622," call it anything you want up to 256 characters long. Instead of

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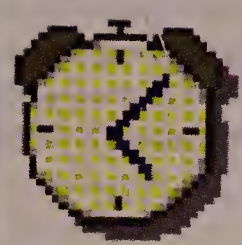
OS/2 Advantages:

Easy to use.
- Object-oriented Workplace Shell interface.

Improves productivity.
- Runs DOS, Windows and OS/2 applications.
- Pre-emptive multitasking.
- OS/2 Crash Protection.™

Advanced 32-bit architecture.
- Fully exploits 386SX processors and above.



start a communications session at a specific time or run programs when you want. OS/2 lets you take full advantage of the latest 386 and 486 technology.

To find out more or to order OS/2, call **1 800 3-IBM-OS2.** In Canada, call **1 800 465-7999.**

With OS/2, you can stop dealing with the limitations of the past, and start rising above them.

higher level.

working within the 640K barrier, take advantage of more of your computer's memory.

Use the PMSeek feature to search for files. Use the built-in ICON editor to custom-design your own icons. Use the Productivity Alarms object to schedule automatic backups,

IBM®

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Here's How

Contents: Spreadsheets 228 | Word Processing 236 | Windows 242 |

HELP LINE Q & A

Tip of the Month

BACK UP A COMPRESSED DRIVE QUICKLY: If you have a backup utility and use a compression utility that compresses your drive into a single file, you can perform a full backup of your hard disk quickly. For example, DOS 6.0's DoubleSpace maintains a compressed drive as a hidden system file, known as the Compressed Volume File (CVF) and named DBLSPACE.000 or something similar. That file is kept in the root of the uncompressed drive, typically D:, that DoubleSpace creates for files that shouldn't be compressed (use DIR \ /A to find the hidden files). Backing up the CVF backs up the entire compressed drive.

In either Backup for DOS or Backup for Windows, select Incremental Backup from the Backup Type list and then select the CVF. You may also want to back up the rest of D:'s files, since they're not included in the CVF. Finally, turn off the Compress Backup Data option in the Options menu and start your backup.

This tip makes for a fast backup since the program doesn't have to deal with as many files, nor must it compress on the fly. If you ever need to restore your drive, restore these files to the root directory of your uncompressed drive. (You won't, however, be able to restore single files or groups of files that the CVF contains.)

Bryan Thompson, Microsoft Product Support

Motherboard Swap

Q Two years ago I bought a 16-MHz 386SX, and now I'd like to upgrade it to something faster. I've seen 25-MHz 386SX motherboards for less than $125—could I replace my existing motherboard with one of those?
Rod Fuller, Rochester, New York

A You almost certainly could. There are two basic styles of motherboards: standard AT, used in full-size desktops and towers, and the narrower "baby" AT, used in small-footprint desktops and minitowers. Unless your system has a very unconventional design (for example, a 3-inch-high case), one or the other of these motherboard types should fit.

This is one upgrade you might not want to do yourself: A motherboard transplant isn't an easy operation, and there can be nasty complications. First you have to dismantle the system to remove the old motherboard. This done, you may find the new motherboard's screw holes don't match the case's internal mounts, in which case you'll have to drill holes in your case or replace the board with one that matches it. And after you've installed the new motherboard, you may find the system doesn't work quite right. For example, the faster clock speed could interfere with an older video board or communications program. If you're sure you can solve this kind of problem and enjoy the challenge, go for it, but otherwise I recommend you pay your dealer to handle this difficult chore.

With prices on 40-MHz 386DX and 25-MHz 486SX boards starting around $200, I don't recommend buying anything slower. When selecting a new motherboard, look for a replaceable CPU or upgrade socket, at least 64K of external RAM cache, and the CMOS setup utility in ROM. Maximum RAM capacity should be at least 32MB, using standard SIMMs installed directly on the motherboard—in other words, you shouldn't have to purchase a memory expansion board to go beyond 16MB. Even if 32MB seems like an absurd quantity of RAM, that capability indicates a fairly up-to-date motherboard design. If the motherboard has built-in serial ports, make sure it uses a 16550 UART chip, which will ensure top performance with high-speed modems. Finally, insist on a money-back guarantee just in case the board doesn't work properly with your system.

Cache Questions

Q I have four questions about caches. Should I disable the 128K cache on my hard drive before running a disk optimizer? Should I disable it when I use a software cache utility such as SmartDrive? What's the optimum size for SmartDrive? And if I do use SmartDrive, what is the best setting for BUFFERS?
Adrian Dieleman, Waupun, Wisconsin

A You should never need to disable the track buffer or cache on the controller built into most current hard drives. In fact, on most drives there's no way to shut it off. Expansion-board caching disk controllers (which take control away from the drive's built-in controller) may conflict with software disk caches, but if you have one, you don't need to install a software cache.

You should disable any cache, hardware or software, before running a de-

ILLUSTRATIONS: ROBERT HEIDEMANN

fragger *unless* the defragger is specifically designed to work with the cache. For example, if you use the cache that came with *The Norton Utilities* or *PC Tools*, you don't need to unload it before running its companion defragger.

My rule of thumb: Dedicate ⅛ of a system's total extended memory to disk caching—but the optimum size depends on how much memory you have and the applications you run. Experiment with different settings to see what works best for you.

When using a disk cache, you can safely set BUFFERS=1 in your CONFIG.SYS. However, if you notice that floppy operations take longer, try setting BUFFERS to 2 or more.

Change Text-Mode Font

Q Is there any utility or other method to change the font DOS uses to display text? I would like to set my display to 43 lines of text, but the font I get in that mode is too hard to read.
Quochung Do, via PC World Online

A How text looks on screen depends not on DOS but on your video board, and there's quite a bit of variation in screen fonts from one board to another. Check the disks that came with your video board, as they may include some alternate screen fonts and a utility to install them.

For a wider range of choices, check out the shareware program *Text Font*. This nifty utility gives you a choice of more than 50 different screen fonts, some specially designed for resolutions greater than the standard 80 columns by 25 lines. You can find it as TEXTFT23.ZIP in Featured in May on PC World Online, or you can order it by mail directly from the author.

- **Text Font** $22 (includes shipping); Pro-Formance; 415/863-0530
  Reader service no. 601

Laptop Shopping

Q I'm shopping for a new laptop and am getting conflicting advice. Some people say the quality of computers varies greatly from one dealer to another, while others say everyone sells the same stuff and I should just look for the best price. Which is true?
Mark Sidenberg, Los Angeles

A There's a big difference between laptops and desktops. Many dealers build their own desktops from parts or have them assembled according to their precise specifications. The best dealers use only top-quality parts, the worst use whatever's cheapest this week. Laptops, however, are assembled at the factory and shipped as complete units. The store might install more RAM, a larger hard drive, or a modem, but that's about it.

Consequently, the quality of desktop clones varies wildly, and choosing a good dealer is very important. Laptops, on the other hand, are like printers: Some are better than others, but once you decide which model you want, you can shop for the dealer with the best price. Just make sure before you buy that lower cost doesn't mean delayed delivery, a diminished warranty, or inadequate service policies.

DISKCOPY Dangerous?

Q I have a 386 with 2MB RAM using DOS 5.0. Frequently, I wish to copy the entire contents of one disk to another. However, I have only one 5¼-inch high-density disk drive. I have been told that using the DISKCOPY command is dangerous because it copies to the new disk regardless of bad sectors. Can you explain?
Michael Young, Newville, Alabama

A If the source disk (the one you're copying) has some bad sectors, DISKCOPY will warn you with the message 'Unrecoverable read error on drive A:'. The corresponding sectors on the target disk (the copy) will be marked as bad by the copy process. Except for wasted disk space, this isn't a problem.

The real danger in using DISKCOPY is that bad sectors on the *target* disk will

USER GROUP OF THE MONTH

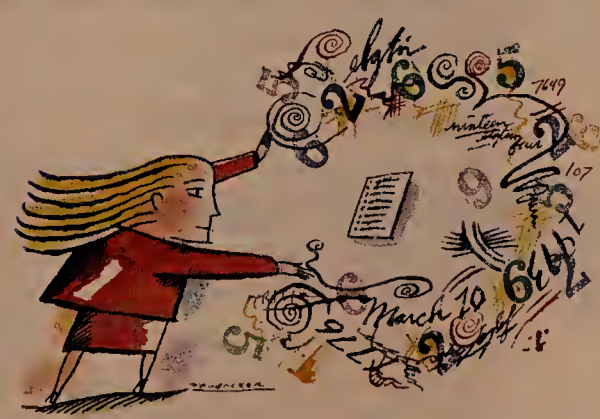
Sacramento PC Users Group

The May User Group Tips come from the Sacramento PC Users Group. Members receive a 64-page monthly newsletter that includes a roster of volunteers who are willing to help other users. The group also operates an electronic bulletin board with more than 30 conferences and a 300MB-plus shareware library. The members hold meetings, which are free and open to the public, on the third Wednesday of every month. Sacramento PC Users Group maintains about 30 special interest groups, including groups for *Windows, Visual Basic, dBASE, FoxPro, Quattro Pro*, OS/2, Novell networks, and multimedia. Additional chapter meetings are held at eight locations in outlying areas.

For more information, contact Tony Barcellos at P.O. Box 162227, Sacramento, CA 95816-2227, or call 916/386-9865 for recorded information. Membership costs $25 a year.
Reader service no. 708

BARE-BONES DIR LISTING: When you need an editable list of a directory's files for a batch file you're creating, you might be tempted to get the list by redirecting a DIR listing using a command such as DIR C:\WINDOWS > C:\WINDIR.TXT. But if you do, all those dates, times, and file sizes that DIR produces will get in the way. However, if you run DIR with the /B option, you will get only the file names (if you also use the /S subdirectory parameter, you will get the path along with the file names). For instance, to put a list of the current directory's PCX files into a batch file, use the command DIR /B *.PCX > NEW.BAT.

Tony Barcellos
Sacramento PC Users Group



not be flagged as bad, as they would if you formatted it. The DISKCOPY command in early versions of DOS (unlike DOS 5.0) didn't reveal its failure to write correctly to such sectors, so not only did you get a bad copy, but if you deleted the disk's files and saved or copied other files to that disk, files that used the bad sectors would be damaged. And its name not withstanding, CHKDSK does't detect or fix the problem. To avoid this problem, format the target disk before using DISKCOPY. If FORMAT reveals bad sectors, don't use that disk for the target.

You can also avoid this problem by using XCOPY. Since you have only one disk drive, using B: in a command makes DOS prompt you to insert a second disk. **XCOPY A:\ B:\ /E/V** will copy everything except hidden and system files and the disk's label. Note that any files marked read-only on the original will be writable on the copy. You can use the DOS commands LABEL A:*label* to duplicate the original disk's label and ATTRIB +R A:*filename* to set the read-only attribute.

Print DOS's TREE

Q How can I print the results of DOS 5.0's TREE command?
Nick Maffei, San Francisco

A The simplest way is to use the command **TREE > LPT1**. The > character redirects the screen output of the TREE command to printer port LPT1. (If your printer's not hooked to LPT1, replace that device name with the appropriate one.) For a nicer printout, use **TREE > PRINTME.TXT** to redirect TREE's output to a file. Then open PRINTME.TXT with your word processor and adjust the font and page breaks for maximum readability.

Upgrading a PS/2 Model 50Z

Q A friend owns an IBM PS/2 Model 50Z and wants to upgrade its 30MB hard drive to something larger. As my friend's PC guru, I went shopping and found that drives for the 50Z cost nearly twice as much as similar IDE drives. Why? Is there a cheaper alternative?
Richard Athens, via PC World Online

A Upgrading a 50Z's hard drive is easy: You just open the case, unplug the old hard drive from its special socket, and plug in the new drive. Unfortunately, this convenient plug-and-play hookup significantly increases the manufacturing costs.

Moreover, since these drives work only with the 50Z and a few other discontinued PS/2s, the market for them is small. As a result, they cost a lot more than IDE drives of the same capacity. Here's a list of companies that make drives for the 50Z. They can put you in touch with local and mail-order dealers that sell their drives.

You could also buy a SCSI adapter and an external SCSI drive, but that route would probably be more expensive than upgrading the original drive. Before investing the money in a drive that will work only with the 286-based 50Z, your friend should seriously consider putting it toward a new 386 or 486 that can handle standard components.

- **CMS Enhancements, Inc.** 714/222-6000, 714/549-4004 (fax)
  Reader service no. 602
- **Core Int'l** 800/688-9910, 407/997-6055, 407/997-6009 (fax)
  Reader service no. 603
- **Kingston Technology Corp.** 714/435-2600, 714/435-2699 (fax)
  Reader service no. 604
- **Procom Technology, Inc.** 800/800-8600, 714/852-1000, 714/852-1221 (fax)
  Reader service no. 605

For more information about all products in this item, circle reader service no. 902.

Run DOS Apps on a Mac?

Q Is there any way that I could run some of my DOS software on a Macintosh? It would be very convenient occasionally.
Andrew Jason Braverman, via PC World Online

A Insignia's *SoftPC* will let you run most DOS apps on a Mac. However, it has some fairly serious limitations. The utility works by emulating a 286 PC in software on the Mac, then loading real MS-DOS (which is included) on top of it. There are three versions: *Universal SoftPC*, with EGA graphics; *SoftPC Professional*, which adds emulated VGA graphics, an emulated math coprocessor, emulated expanded memory, and protected-mode emulation; and *SoftPC With Windows*, which emulates VGA graphics, comes with a run-time version of *Windows 3.1*, and can run *Windows 3.1* programs (though only in standard mode).

The main problem with *SoftPC* is that a 286 emulated in software is slower than the real thing, even on the fastest Macs, and particularly when running graphical applications. It also takes a lot of memory: Users say the program wants about 5MB, 8MB, or 16MB to perform well, depending on the version. You'll be happier running your DOS apps on the real thing if that's possible.

- **Universal SoftPC 3.0** $165, SoftPC Professional 3.0 $325, SoftPC With Windows $499; Insignia Solutions Inc.; 800/848-7677, 415/694-7600, 415/964-5434 (fax)
  Reader service no. 700

TSR Programming Correction

In last December's column, I mistakenly switched the descriptions of two off-the-shelf kits used for writing memory-resident utilities. *Magic TSR Toolkit* works with C and assembly language, and *TSRs Made Easy* works with Turbo Pascal.

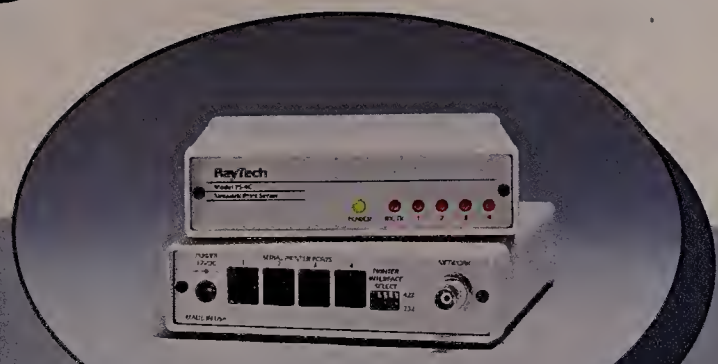
- **Magic TSR Toolkit** $199.95; Quantasm Corp.; 800/765-8086, 408/244-6826
  Reader service no. 606
- **TSRs Made Easy** $49; TurboPower Software; 800/333-4160, 719/260-9136, 719/260-7151 (fax)
  Reader service no. 607

By Robert Lauriston

Robert Lauriston is a regular contributor to PC World.

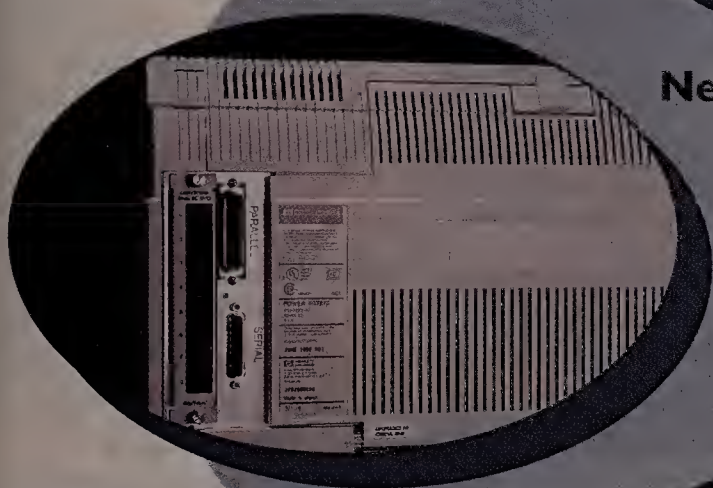
Mail your questions to Help Line, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to the Help Line forum on PC World Online; CompuServe, 74055,412; MCI Mail, PC World Editorial; or 415/442-1891 (fax).* PC World *pays $50 for published questions. Sorry, we cannot acknowledge unpublished materials.*

Making The Best Better

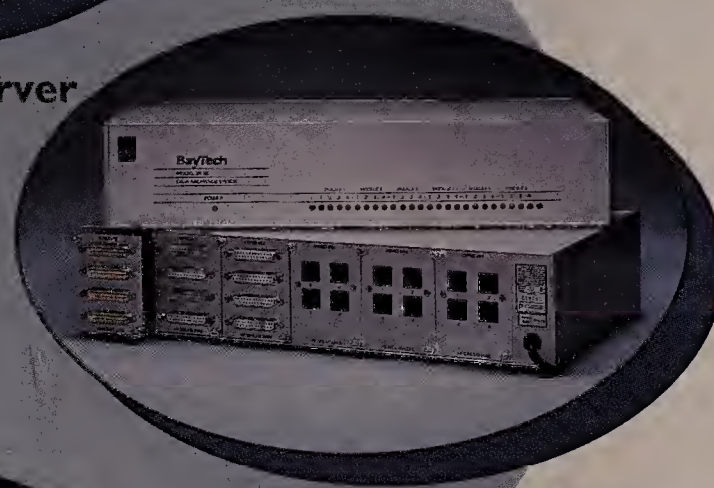


New

Network Print Server



Plug-in Printer Sharing



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SPREADSHEETS Q & A

The Last Word on the Last Day

Q This is not a question, but I've got a better alternative than the one you published in December for calculating the last day of the previous month. Put your date in A1, for instance, @NOW(). Next, in any cell, enter the formula +A1-@DAY(A1). Format both cells with */Range•Format•Date,* widen the columns if necessary with */Worksheet•Column Set-width,* and voilà!

Kevin Larsen,
Highlands Ranch, Colorado

A Okay, Kevin, of all the suggestions I've received for this problem, yours is best. You've earned your fifty bucks!

Current-Week Formula in Works

Q I use *Microsoft Works* to manage my investments. Each week I enter the current value of various items, and I want to use formulas to calculate the change from the previous week. How can I do this without totally rebuilding the formulas?

Harry L. Carden, Memphis

A The solution, in *Works* and other spreadsheet programs, involves the INDEX() function, which returns a value from a table based on its row and column number. **FIGURE 1**, modeled after the spreadsheet you've submitted, shows weekly Dow Jones values; the formula in cell B10, =INDEX(B2:B8,0, COUNT(B2:B8)-1)-INDEX(B2:B8,0, COUNT(B2:B8)-2), calculates the difference between the last two weeks. In the formula, COUNT(B2:B8) calculates the number of weeks you've filled in. INDEX(B2:B8,0, COUNT(B2:B8)-1) looks in the range B2:B8, in column 0 (*Works,* like *1-2-3* and *Quattro* but unlike *Excel,* counts the first column or row in a range as zero), and returns the value from the row indicated by COUNT(B2:B8)-1, that is, the current week's Dow. The second INDEX() function returns the Dow from the previous week. Then the formula subtracts one from the other to arrive at the result shown in B10.

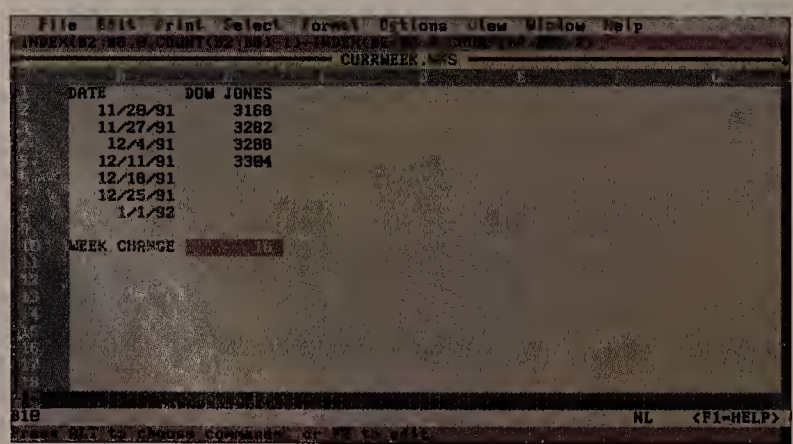

FIGURE 1: IF YOU TRACK STOCKS, you can use this formula to calculate the difference between weekly Dow Jones values.

1-2-3 Print-to-File Macro

Q I've written a *1-2-3* release 2.4 macro to print a range of cells to a file. My problem is that I need to use a different sequence of keystrokes depending on whether the target file already exists: If it does, the macro must respond to a menu prompting me to replace the existing file. Is there some way for the macro to tell if the file exists and replace it only if it does?

Boon Chong Lee, Ypsilanti, Michigan

A The {open} command lets you determine whether a file exists, and allows your macros to respond accordingly. Here's one solution.

First, enter the labels as shown in **FIGURE 2**, then put the cell pointer on A1, execute */Range•Name•Labels•Right,* paint the range A1..A4, and press **<Enter>**. Use */Range•Name•Create* to assign the range name **PRINT_ME** to A1..B4. To execute the macro, press **<Alt>-P**.

	A	B
1	\P	/pf{esc 2}D:\THE_FILE~
2		{open "D:\THE_FILE.PRN",r}{branch \P_1}
3		r
4	\P_1	crrPRINT_ME~agq

FIGURE 2: BEFORE PRINTING TO A FILE, this 1-2-3 release 2.4 macro checks to see if the file exists.

Here's how it works:

/pf{esc 2}D:\THE_FILE~. This statement executes the command */Print•File,* clears the current file name and path from the command line with {esc 2}, and then enters the file name D:\THE_FILE.

{open "D:\THE_FILE.PRN",r}{branch \P_1}. This statement checks for the file indicated in B1 by attempting to open it. (The ,r is an argument for read-only.) If the file does not exist, the macro executes the {branch} statement, which sends the macro to cell B4.

r. This keystroke is issued only if the file already exists, and it responds to the menu prompt to replace the file.

crrPRINT_ME~agq. The final statement clears the existing print range, resets it to PRINT_ME, and prints it.

Automatic Timed Backups

Q Is there an add-in utility that will create timed backups of *1-2-3* spreadsheets at intervals set by the user, as does *WordPerfect*'s backup feature?

Douglas Kelner, Oak Park, Illinois

A Intex Solutions (617/449-6222) offers a $95 add-in called *ExtraCopy* that provides automatic timed backups for release 2.*x,* but to my knowledge, there is not a similar add-in for release 3.*x.*

Excel 4.0 users can activate the Auto Save add-in provided with the program: Select *Options•Add-ins•Add,* select *AUTOSAVE.XLA* from the EXCEL\LIBRARY subdirectory (assuming you installed it), click *OK,* and *Close* the Add-In dialog box. Then select *Options•Auto Save* and choose the save interval and other options.

If you didn't install the add-in, run SETUP.EXE on *Excel* disk 1. Indicate which directory your copy of *Excel* is located in, and select *Custom Installation.* In the Options dialog box, deselect

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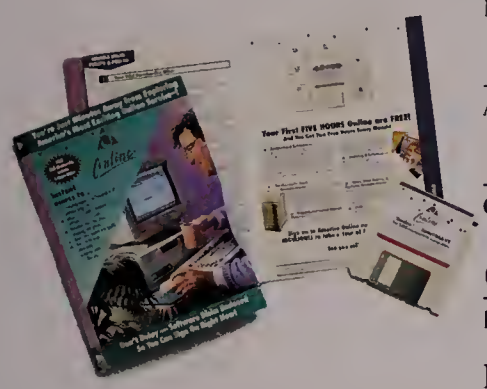

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everything except Macro Library. Click the *Library* button, deselect everything except Automatic Document Saving, and click *OK*, then *Setup*.

Flagging Macro in 1-2-3

Q I need a *1-2-3* macro that will flag all the missing values in a sorted column of numbers, as in a checking account statement. For example, if the values are 1, 2, 3, 5, 6, 7, 8, the macro should put an asterisk in the cell beside the 5 because the sequence is missing a 4. Any ideas?
Scott Filipek, Doraville, Georgia

A My solution is shown in **FIGURE 3.** The macro walks through a sorted list of integers, comparing each with the previous one. When it finds a missing value, it steps the cell pointer one cell to the right and enters an asterisk. When it encounters an empty cell, it stops. To set it up, enter the labels shown, then go to A1, use */Range•Name•Labels•Right* to name cells B1 and B6 with the label range A1..A6. To execute it, put the cell pointer at the top of the list (cell A9) and press **<Alt>-F**. The macro details are given below.

```
A    A          B        C        D        E        F        G        H
1  \F       {let \F_FIRST,@cellpointer("contents")}
2           {down}
3           {if @cellpointer("type")="b"}{quit}
4           {if @cellpointer("contents")<>\F_FIRST+1}{r}*~{l}
5           {branch \F}
6  \F_FIRST        8
7
8
9         1
10        2
11        3
12        5 *
13        6
14        7
15        8
16
```

FIGURE 3: FLAG MISSING VALUES in a sorted list of numbers with this 1-2-3 macro.

{let \F_FIRST,@cellpointer("contents")}. Copies the current cell's value into cell B6, \F_FIRST.

{down}. Moves the cell pointer to the next cell.

{if @cellpointer("type")="b"}{quit}. If this new cell is empty, halts the macro.

{if @cellpointer("contents")<>\F_FIRST+1}{r}*~{l}. If the new cell does not contain the next number in the series, moves the cell pointer to the next column, enters an asterisk, and moves the pointer back to the column of numbers.

{branch \F}. Sends the macro back to cell B1 to start over.

Quick Number Conversions

Q I use *Quattro Pro* and data from *The Daily Racing Form* to handicap horse races. The source data is in minutes, seconds, and fifths of a second, which I need to convert to seconds and tenths of a second. Any suggestions?
James Woodfield, Burlingame, California

A After tinkering with various strategies, I came up with this one, which seems to work pretty well for quick data entry. Let's say you're going to enter the data into column A beginning in cell A2. First, use the command */Database•Data Entry•Labels Only* and enter a range to set the cells in column A to accept only labels. Enter the data in the format minutes;seconds.fifths. (Using a semicolon instead of a colon may look funny, but it's easier to type.) For example, 4;30.2 would mean 4 minutes, 30 and ⅖ seconds.

Then, in cell B2, carefully enter the following long and grotesquely complicated formula:

```
@VALUE(@LEFT(A2,@FIND(";",A2,0)))*60+
    @VALUE(@MID(A2,@FIND(";",A2,0)+1,
    @FIND(".",A2,0)-@FIND(";",A2,0)-1))+
    @VALUE(@RIGHT(A2,@LENGTH(A2)-
    @FIND(".",A2,0)-1))/5
```

Copy it as needed into column B.

The formula uses the semicolon and period as delimiters to parse the minutes, seconds, and fifths, then converts them to decimal seconds: @VALUE(@LEFT(A2,@FIND(";",A2,0)))*60 takes the characters to the left of the semicolon, converts them to a numeric value, and multiplies by 60 to convert minutes to seconds. @VALUE(@MID(A2,@FIND(";",A2,0)+1,@FIND(".",A2,0)-@FIND(";",A2,0)-1)) uses @MID to isolate the characters between the semi-

USER GROUP TIP

Quattro Pro/W Paths

***Quattro Pro for Windows* shares one annoying habit with just about every *Windows* program: Loading or inserting a file resets your default working directory. Fortunately, you can create a speed button that will return you to your preferred directory.**

To make the button work, go to the Application dialog box by selecting Property • Application or pressing <Alt>-<F12>. Select Macro from the list, change the Slash Key option to Quattro Pro - DOS, and select OK. Back in the worksheet, click the SpeedButton tool icon on the SpeedBar (shown here), then click in the worksheet where you want to place the upper left-hand corner of the button and drag to size it. Right-click the new button, select Macro, and enter the macro command {/ File;Directory} and the path to your default working directory. For instance, if your desired working directory were C:\DATA, you would enter {/ File;Directory}C:\DATA. Click OK. To label your button, right-click on the button again, select Label Text, enter a name, and click OK.

If you'd like, you can even add your macro to *Quattro Pro*'s SpeedBar or menus.

Gene Weisskopf
Sacramento PC Users Group

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MASTER CLASS: EXCEL 4.0 GRAPHS WITH ERROR BARS

This month's Master Class addresses a question from Joan Portwood of Durham, North Carolina. Scientists in her company want to create line and column graphs with error bars.

Error bars evaluate the significance of the differences between points on a graph by showing the variability of the data contributing to each point. Here, the points are group averages, and the error bars show one standard deviation above and below average.

For example, if you chart the average height of several groups of people, adding error bars can determine whether the variability of heights in each group is small, which may make the data more compelling than if the variability is large. We'll start with a line graph with error bars, then apply the techniques to a column chart.

Enter the labels in row 1, the observation numbers in A2:A5, and the sample means shown in B2:F5 of FIGURE 1. In cell G2, enter =AVERAGE(B2:F2) and copy it to G3:G5. In H2, enter =G2+STDEV(B2:F2) and copy it to H3:H5; in I2, enter =G2-STDEV(B2:F2) and copy it to I3:I5. Select G2:I5 and hide decimals by selecting *Format • Number • All*, choosing the *0* format, and clicking *OK*.

To create the line chart, select A2:A5, hold down the <Ctrl> key, and select G2:I5. Now click the Chart Wizard tool, then move the pointer into the worksheet, and drag to size the rectangle that will contain the chart. Click *Next* in the first Wizard dialog box. In the Step 2 dialog box, double-click *Line;* in the Step 3 box, double-click *7*. In the Step 4 dialog box, make sure Data Series is set to Columns, and set the first column to be Category (X) Axis Labels. Click *Next*. In the Step 5 box, click *OK*. The resulting chart shows standard deviations connected by a vertical bar, with the mean value in the middle in blue.

Now customize the chart: Double-click it to open a chart window. Right-click the *y*-axis and select *Scale*. Deselect Minimum and Maximum, type 40 as the minimum value, and click *OK*. Right-click a red marker, and select *Patterns*. Under Line, click Custom, set Color to blue and Weight to a heavier line; under Marker, select None, and click *OK*. Right-click a green marker, and select *Patterns*. Under Marker, set Background to black and Foreground to white (to minimize marker size). Repeat for the blue series.

Right-click on a number on the *y*-axis, choose *Gridlines*, and under Value (Y) Axis, choose Major and Minor, and click *OK*. Right-click a gridline that's *not* next to a number, and choose *Patterns*. Then in the Style list box, pick a broken line and select *OK*. Select *File • Close*.

Now for the column chart. Copy the line chart you built: Hold down the <Ctrl> key, then click and drag the chart to create a copy. Double-click the copy to edit it. Select *Gallery • Combination* and double-click option *1*. You'll see a column chart with a line chart overlay, but you'll need to rearrange the data series and add vertical lines: Select *Format • Overlay*. In the First Overlay Series box at the bottom of the Format Chart dialog box, enter 2; under Format, select Hi-Lo Lines and click *OK*.

To eliminate the connecting lines, right-click any red marker, and select *Patterns*. Under Line, select None, under Marker, select None, then click *OK*. Repeat for the green series. Right-click a bar, select *Patterns*, and set to a heavier line weight. Right-click a column, choose *Patterns*, and select a dotted pattern. Click *OK*, and select *File • Close*.

At first glance, the column chart seems to show that the third group is taller, on average, than the first. But the error bars tell a different story. The overlap of the error bars indicates that many individuals in the first group are actually taller than the average of the third group. Thus, the differences are not as important as they may first appear.

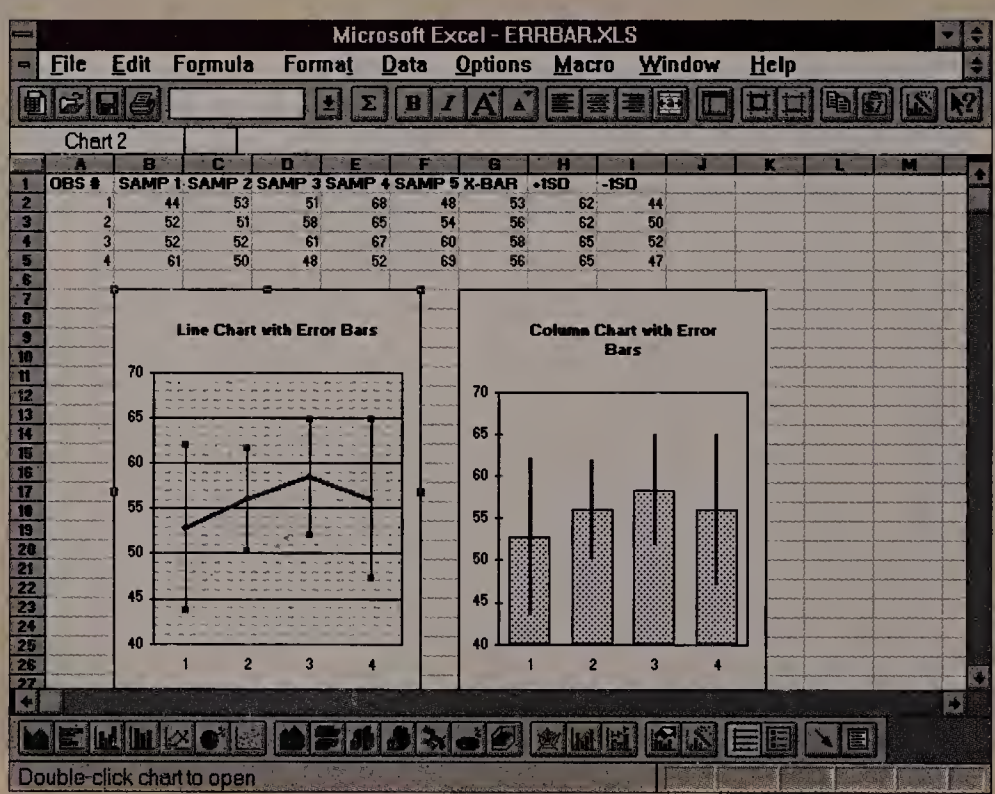

FIGURE 1: ERROR BARS help you compare variations among groups of numbers.

colon and period: @FIND(";",A2,0)+1 is the position of the first character after the semicolon, and @FIND(".",A2,0)-@FIND(";",A2,0)-1 is the number of characters between them. @VALUE(@RIGHT(A2,@LENGTH(A2)-@FIND(".",A2,0)-1))/5 converts the characters after the period to values, then divides by five to convert fifths to decimals. Elegant it ain't. But it works.

By Richard Scoville

PC World *contributing editor Richard Scoville is a software training consultant based in Chapel Hill, North Carolina.*

Mail your spreadsheet questions to Spreadsheets, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to the Spreadsheets forum on PC World Online; CompuServe, 72341,2727; MCI Mail, 357-4517; or 415/442-1891 (fax).* PC World *pays $50 for published questions. Sorry, we cannot acknowledge unpublished materials.*

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WORD PROCESSING Q & A

Fixing Mistakes in WordPerfect for DOS

Q I keep making a couple of annoying mistakes in *WordPerfect 5.1* that I can't seem to rectify. First, when I accidentally press <Shift>-<Tab>, I can't get the editing screen to return to normal; one line shifts to the left, leaving the rest of the document over on the right, even after I delete the 'Mar Rel' code in the <Alt>-<F3> Reveal Codes window. Second, if I press <F9>, an '{END FIELD}' code appears on the screen and 'Field: 2' appears on the status line. Although I can easily delete the '{END FIELD}' code, I can't manage to get rid of the status line message. Can you help me out of these keystroke quagmires?

Gwen McCoy, Toronto

A As you've discovered, it's far too easy to press the wrong key in *WordPerfect 5.1* and accidentally change your document. But there are solutions for both your problems.

In the first case, if you accidentally insert a margin release by pressing <Shift>-<Tab>, press **<Alt>-<F3>** to open the Reveal Codes window, press **<Backspace>** to delete the [Mar Rel] code with the key, then press **<Alt>-<F3>** again to close the Reveal Codes window. Finally, press **<Ctrl>-<F3>R** to restore your document to its normal screen alignment. If <Ctrl>-<F3>R doesn't correct your screen, you've got a very early revision of *5.1*, in which case, use **<Shift>-<F3>** twice instead.

Your second problem is more annoying. The <F9> key inserts that pesky {END FIELD} code, which marks the end of a field in a mail-merge data file. Since the <F9> key is right next to the frequently used <F10> key, it's easy to make this mistake.

But there's a way out: First, press **<Backspace>** to delete the {END FIELD} code, then type !@, or some other character combination you aren't using in the document, to mark your current location in the document. Now, press **<Home><Home><Up>** to remove the 'Field: 2' status line message. Finally, press **<F2>!@<F2><Backspace><Backspace>** to return to your place in the document and delete the !@ marker.

Advancing in Word for Windows

Q My entire department is making the transition from using *WordPerfect 5.0* to using *Word for Windows 2.0*. Everything's going very well so far, but there's one *WordPerfect* feature I miss having. Is there a *WinWord* equivalent for *WordPerfect*'s Advance feature that lets you position text at a specific location on the page?

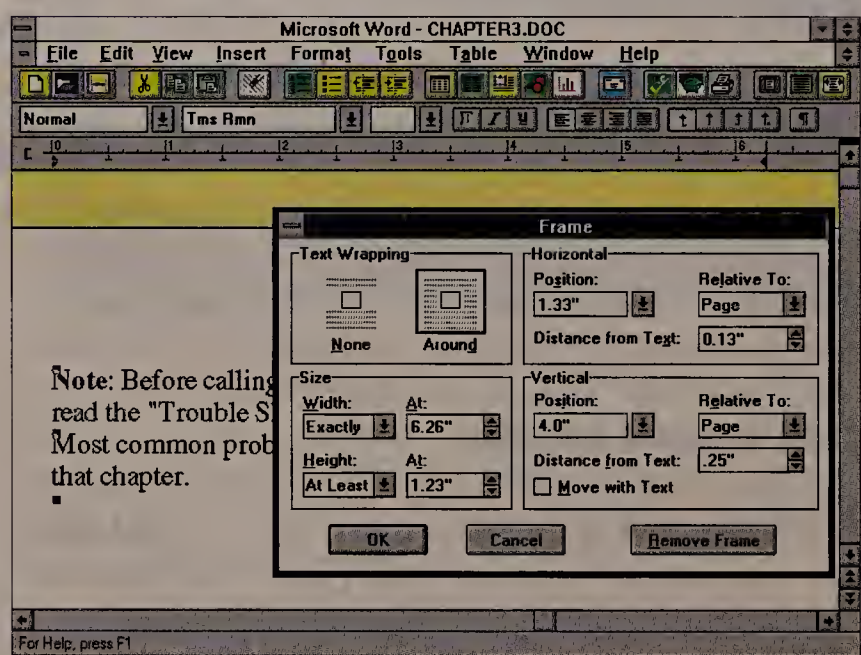
Renee L. Wright, Portland, Oregon

A While there isn't an exact *WinWord* equivalent for *WordPerfect*'s Advance, there's something that's even better. By using frames in *Word for Windows*, not only can you position text precisely, you can also control border styles, wrap other text around your carefully positioned frame, and move the text anytime you want by dragging it into position. Here are the basics of using frames:

To create a new frame for text, select *Insert•Frame*. If you aren't already using *WinWord*'s Layout view, you get a message asking whether you want to select the Layout View here; select *Yes*. Position the cross-hair pointer where you want the upper left corner of the frame to be, then click and drag the frame outline into position. Type your text inside the borders or cut and paste text from elsewhere in the document. The frame's height will expand, if necessary, to hold the text you type. You can also frame existing paragraphs by selecting them, then giving the *Insert•Frame* command.

To move a frame, click in text outside its borders, then move the mouse pointer over the frame and click and drag it to a new location. To modify the size of the frame, first click outside it, then click once on the frame to select it. You'll see sizing handles appear around the frame; you can resize the frame by dragging on one of these handles. For more precise sizing and positioning, select the frame, then select *Format•Frame* and use the Frame dialog box to alter the frame's characteristics, such as its width or position.

To format a frame's border lines, select the frame, then select *Format•Border* and select border styles in the dialog box. If you choose no border, but still want to see the frame's outline on your screen, select *Tools•Options•View*, check the Text Boundaries option, then select *OK*.



WORD FOR WINDOWS' FRAME FEATURE lets you position text precisely, control border styles, wrap other text around your frame, and move the text anytime you want.

Printing the Picture in WordPerfect for Windows

Q I've run into a printing problem in *WordPerfect 5.1 for Windows*. If I include a graphic in my document, it prints just fine when I use the *WordPerfect* printer drivers, but doesn't print if I use TrueType fonts and a *Windows* printer driver. What gives?

Lloyd L. Roberts, Huntington Beach, California

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Now that we have whetted your appetite with the really intriguing stuff, let's go back to the basics for a minute.

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- Projects
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And now, a few words about an advanced new technology called *agents.* Much more powerful than traditional macros, agents let you totally automate many of the tasks you used to do yourself. Here's how they work.

First, you select a *trigger* that will activate an agent. Then specify the *actions* you want to take place. For example, you can specify time triggers, such as at 5 PM every day, or at ten in the morning the first day of every month.

Or you can specify data triggers, such as when a sales order exceeds $5,000, or when inventory is below 25 units.

You can then specify actions that will alert you, display data that you need, execute another command, launch an application, etc.

The next time all the conditions specified in the trigger are met, the actions you asked for will occur automatically.

Now, if you've read this far and haven't nodded off yet, do keep going, because we're about to get to the really good stuff.

POWERFUL FEATURES YOU CAN'T FIND IN ANY OTHER PIM.

By now you're probably thinking, "Okay, I sort of understood that last section, but what can these agents and triggers do for *me*?" Well, here are some examples of how you can use agents to help you:

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- Print out your To-Dos and calendar for the next week the evening before you're scheduled to travel.
- Mark all of today's incomplete To-Dos as overdue and assign them to tomorrow's project list.
- *Automatically* fax a flower delivery authorization to your florist for any customer who places an order over $10,000.
- Display a view each morning at 9:30 of every customer who hasn't placed an order in two weeks.
- Send yourself a reminder one week in advance of any scheduled presentations so that you'll have adequate time to prepare.
- *Automatically* switch any task that contains the words "urgent" or "immediately" to your high-priority message or To-Do list.
- Run a disk diagnostic program Thursday at midnight and save the results.

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- Company time and resource allocation
- Project management
- Expense tracking, reporting and auditing
- Customer database management
- Telemarketing sales management
- Inventory tracking and control

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Before sending you off into the jungle that the PIM marketplace has become, we'd like to elaborate just a little bit more on some of our standard features.

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Built-in letter writer lets you take advantage of Commence's integration with other Windows word processors, like Microsoft Word for Windows™ and Lotus® Ami Pro.™

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PIM REVIEWERS GO ON AND ON, TOO.

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"It competes head on with products like Polaris PackRat...But it goes a step beyond them..." *PC Sources,* December 1992.

"[Commence] comes with a set of tools that can organize ideas and manage time right out of the box, while ambitious users can customize the package to shape it to unique information management needs." *PC Magazine,* October 13, 1992.

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A You're not alone. In fact, many users are confused by the differences between the *WordPerfect* printer drivers and *Windows* printer driver. Your missing picture is a typical example of this problem. If you're accustomed to the old *WordPerfect* printing techniques, you may be missing just one step. Try this:

Select *File•Select Printer*, then in the resulting dialog box, in the Printer Drivers section, click the Windows button. Next, select *Setup* and make sure the printer's resolution is set to its maximum (typically 300 dpi), select *OK*, then choose *Select*. There may be a short delay while *WordPerfect* updates its printer information. Now, select *File•Preferences•Print*.

In the Print dialog box, in the Windows Print Drivers section, uncheck the Fast Graphics Printing box, because this speedier printing technique for graphics doesn't work on some printers. Select *OK* to return to the *WordPerfect* editing screen.

Finally, whenever you select File•Print for a document, check the Print dialog box to make sure that the Graphics Quality list box reads 'Set In Driver'. Once you've made these changes, they become the new defaults, so you won't have to bother setting things up again.

Marking the Odd Block in WinWord

Q I often create short columns in *Word for Windows* documents using my <Tab> key, and sometimes I want to underline or boldface just the left-hand column. But when I try to select the left column, the highlight covers part of the right-hand column, too. Is there any way to select only the left column?

Harry Powers, Arlington, Massachusetts

A There's a terrific way to highlight and format any text you have in a block that's set off by tabs, as long as you have *Word for Windows* version 2.0b or later. Just place your cursor where you want to start highlighting, then hold down the right mouse button as you drag over your column. Now you can format all the text contained in the highlighted block.

You can even highlight part of a character. Note, however, that if more than half of a character is covered by the highlight, the character will take on the formatting you apply; if you press **<Delete>**, you'll delete only the characters that are inside the highlighted block.

Also, if you try to select a block using this method in order to use the spelling checker, the highlighting will expand to include the entire line. Otherwise, the highlighting will go anywhere you want it to, and it really isn't at all dependent on the page format you're using.

By George Campbell

George Campbell is a contributing editor for PC World.

Mail your word processing questions to Word Processing, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to the Word Processing forum on PC World Online; CompuServe, 71571,222; MCI Mail, GCAMPBELL; or 415/442-1891 (fax).* PC World *pays $50 for published questions. Sorry, we cannot acknowledge unpublished materials.* ■

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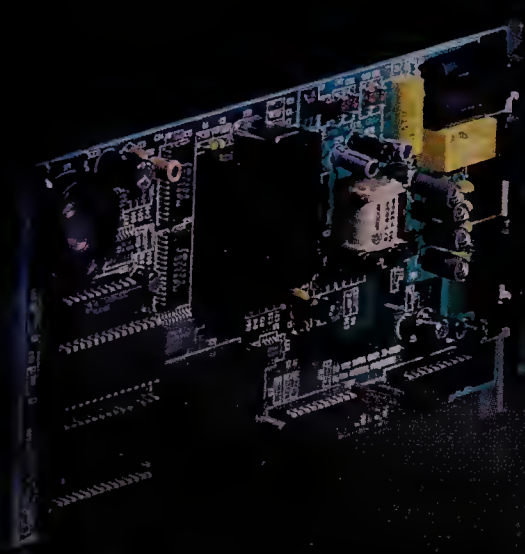

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WINDOWS Q & A

Looking for EMM386

Q After I upgraded from *Windows 3.0* to *3.1*, I noticed that the old EMM386.SYS file (dated May 1, 1991) was still on my hard disk—along with a file named EMM386.EXE (dated March 10, 1992). Should I still use the old SYS file, or delete it and only use the EXE file? What about the EMM386.EXE file that's in my DOS 5.0 subdirectory?
Ed Piercy, El Dorado Hills, California

A *Windows 3.1* doesn't use EMM386.SYS, but rather the new and improved EMM386.EXE. Like its predecessor, EMM386.EXE is referenced in CONFIG.SYS and is used to emulate expanded memory on 386 and 486 PCs for non-*Windows* applications. It's also used to manage the upper memory area (address 640K through 1MB), allowing you to load device drivers and memory-resident programs high. You can safely delete the old EMM386.SYS file. As for identical DOS 5.0 versus *Windows 3.1* files, when you're in doubt, always use the one that was created most recently.

ATM Be Gone!

Q Since I now have *Windows 3.1* with TrueType built in, I decided to dump *Adobe Type Manager*. I deleted all the ATM files (ATM*.*) in both my \WINDOWS and \WINDOWS\SYSTEM directory. But then I found *Windows* wouldn't load. So I used an undelete utility to restore the files in the \WINDOWS\SYSTEM directory, but the *ATM* icon appears (with an 'X' through it) when I start *Windows*. How can I rid my system of this program?
Kristen Meesman, Calgary, Alberta, Canada

A Not to worry. In File Manager or Program Manager, choose *File•Run*, type **SYSTEM.INI**, and press **<Enter>**. When the SYSTEM.INI file opens in Notepad, search for the line 'system.drv=atmsys.drv' and delete it. Then find 'atm.system.drv=system.drv' and change it to **system.drv=system.drv**.

Save SYSTEM.INI and restart *Windows*. You can now delete *ATM*'s files. In the \SYSTEM subdirectory, erase ATM.DLL (present only if you've used *ATM 1*.xx), ATM16.DLL, ATM32.DLL and ATMSYS.DRV. In \WINDOWS, delete ATM.INI and ATMCNTRL.EXE. You should also remove any PFM and PFB font files installed by *ATM* in its \PSFONTS subdirectory. Finally, delete the *ATM* icon from Program Manager.

Admiring the Wallpaper

Q Whenever I start *Windows*, the Program Manager covers up my wallpaper. Is there any way to load Program Manager so the wallpaper will automatically be visible?
Richard Rogers, Charlottesville, Virginia

A All you have to do is add a Program Manager icon to *Windows*' StartUp group. Open the StartUp group window, choose *File•New*, select *Program Item*, and click *OK*. In the Program Item Properties dialog box, type **Program Manager** in the Description text box, **PROGMAN.EXE** in the Command Line text box, click the Run Minimized box, and click *OK*. Later, if you add another application to the StartUp group, make sure its Run Minimized box is also checked.

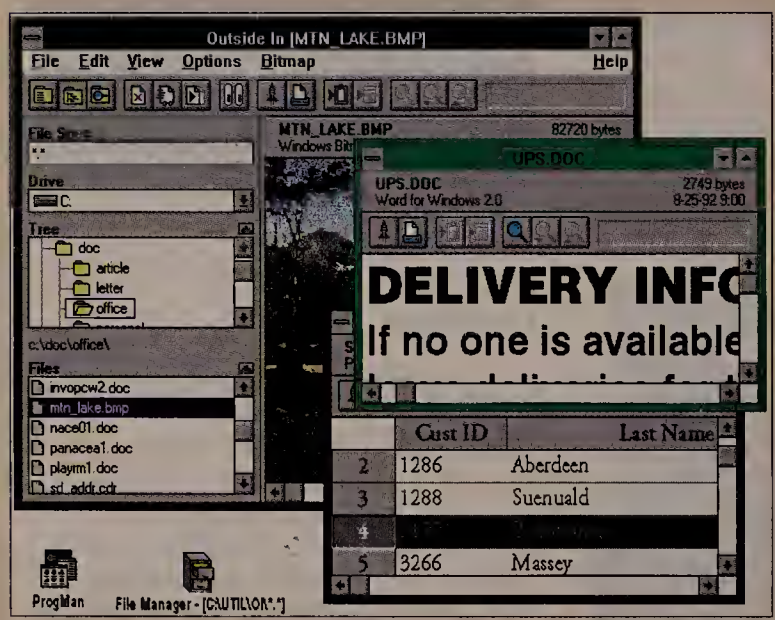
By the way, there's another benefit to creating a Program Manager icon: You can assign it a hot key. In the StartUp Group window, select the new icon, press **<Alt>-<Enter>**, click in the Shortcut Key text box, and choose a key. Now you'll be able to toggle to Program Manager anytime you want.

Quick and Cheap Presentations

Q I need to give occasional on-screen presentations using my PC, but I don't do it often enough to justify the expense of a presentation program. Doesn't Paintbrush have a slide show mode I can use?
Joseph Sargologos, Ashland, Oregon

A Not really, but with a simple Recorder macro, Paintbrush can do the job fairly easily. Here's how.

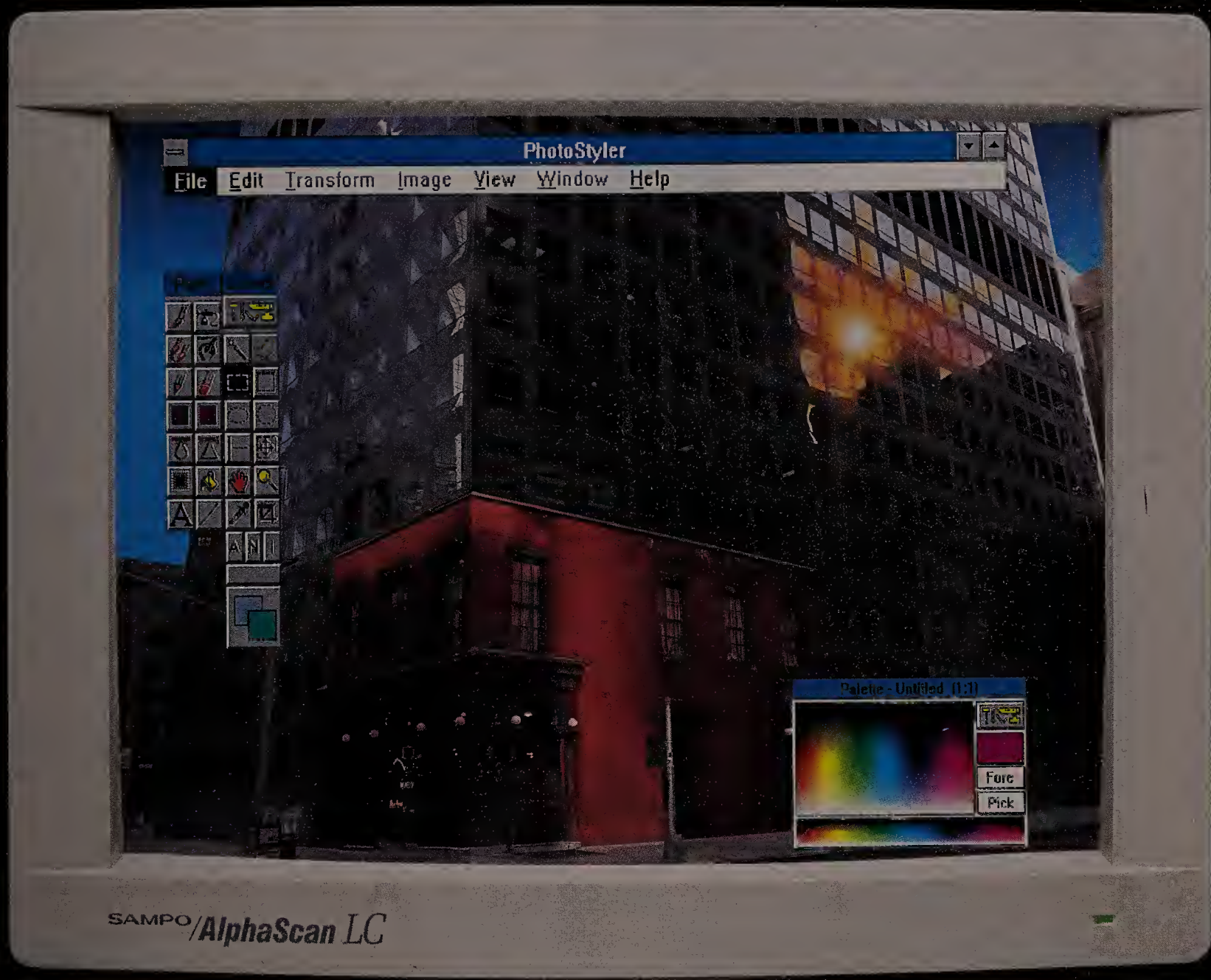
Windows Toolbox



Outside In for Windows 2.0 **is a cut above other file viewers, recognizing 120 word processing, database, spreadsheet, graphics, and compressed file formats. Better still, you can select any portion of a displayed file and copy it to the Clipboard, making it a breeze to add text and graphics to other *Windows* applications. *Outside In* can appear on *Word for Windows, Norton Desktop for Windows*, File Manager, and other program menus, and you can integrate it with popular *Windows* E-mail programs for viewing attached files. *Outside In for Windows* also performs full-text searches on any of the word processing, database, or spreadsheet files it supports. Available for $89 from Systems Compatibility Corp., 401 N. Wabash #600, Chicago, IL 60611; 800/333-1395, 312/329-0700, 312/670-0820 (fax).**

Reader service no. 726

THE FIRST RULE OF WINDOWS IS REAL ESTATE, REAL ESTATE, REAL ESTATE.



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Circle 255 on reader service card

TO TURN PAINTBRUSH INTO A PRESENTATION PROGRAM, order your pictures alphabetically and whip up a quick Recorder macro.

First, all your presentation pictures should be in the same format (all BMP, for example), stored in the same directory, and they should be the only files present in that format (with one exception, noted below). If the images must be displayed in a specific sequence, rename them in alphabetical order, such as A-INTRO.BMP, B-CHART.BMP, C-PLAN.BMP, and so on.

Finally, the directory should contain at least eight "dummy" files with the same extension as your picture files, named so that they appear at the top of Paintbrush's file list. (This is necessary in order to overcome a quirk in Paintbrush's file list function.) To create a dummy file, launch Notepad, press **<Space>**, and save the file with a name something like **001DUMMY.BMP**. Choose *File•Save As* and save it again, but this time as **002DUMMY.BMP**. Repeat this procedure until you have a total of eight dummy files.

Now it's time to create the macro. Launch Paintbrush and open the first picture in your presentation. Then launch Recorder and select *Macro•Record*. In the Record Macro Name text box, type a name. In the Playback section, select *Same Application* in the To list box, choose *Fast* in the Speed list box, and check the Enable Shortcut Keys check box.

In the Record Mouse list box, select *Ignore Mouse*. In the Shortcut Key section, pick an <Alt>-*key* combination that will advance your slides. Don't use <Ctrl> or <Shift> in your shortcut key or Paintbrush will flash annoyingly during slide changes.

Click *Start* to begin recording, hold down the **<Alt>** key, and press **<Tab>** until you toggle back to Paintbrush. In Paintbrush, press **<Alt>FO**. Press **<Tab>** once, the **<Down>** cursor key twice, and then **<Enter>**. Press **<Ctrl>-P** to display the picture full screen, and press **<Ctrl>-<Break>** to stop recording. When the Recorder dialog appears, select *Save macro* and then click *OK*. Switch back to Recorder and save the macro file.

That's all there is to it. The next time that you need to run a quick presentation, launch Recorder and then open the appropriate REC file. Next, run Paintbrush, open the first picture, and press **<Ctrl>-P** to display it full screen. Press your Recorder shortcut key to advance each slide. Note: Once the macro is running, you can't use the <Esc> key to cancel Paintbrush's View Picture mode. To return to the standard Paintbrush window, click the picture several times.

Keeping File Manager Up-to-Date

Q I often use *PKZIP* while in *Windows* to decompress files I download from various BBS's. But when I switch to File Manager to see the newly decompressed files, they aren't there. I have to press <F5> to refresh the directory window. Can't File Manager update the directory automatically?
Will Marquardt, Media, Pennsylvania

A As long as you're running *Windows* in 386-enhanced mode, you can have File Manager perform this service by making a simple change to the SYSTEM.INI file. First, make a copy of this file in case something goes wrong (it's in the same directory as *Windows*). In either Program Manager or File Manager, choose *File•Run*, type **SYSTEM.INI**, and click *OK*. When the file opens in your text editor, search for the line that begins FileSysChange= and make it read **FileSysChange=on**. If you can't find this line, add it underneath the [386Enh] heading. Then save the file and restart *Windows*.

You'll now have the behavior you hoped for. But because File Manager must now monitor all file creation, deletion, and renaming in your non-*Windows* applications, you may notice a slowdown in performance. If your performance is seriously affected, you can turn the function off by making this line read **FileSysChange=Off**.

By Scott Dunn

Scott Dunn is a contributing editor for PC World *and coauthor of* 101 Windows Tips *(Peachpit Press, Berkeley, California, 1992).*

Mail your questions to Windows, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to the Windows forum on PC World Online; CompuServe, 74055,412; MCI Mail, PC World Editorial; or 415/442-1891 (fax).* PC World *pays $50 for published questions. Sorry, we cannot acknowledge unpublished materials.*

POWER TIP no. 281

Tracking Time in WordPerfect 5.1

You can easily log the time it takes to complete a project in *WordPerfect* by using a macro to insert a time/date stamp in your document. Run the macro when you begin and when you finish. To create the macro, press <Ctrl>-<F10>, type Time, and press <Enter>. Then type Time Stamp and press <Enter>. Next, press <Shift>-<F5>F7:9 3 1, 4 and <Enter>. Press 1 and then <Ctrl>-<F10> to stop recording the macro.

To use the macro, press <Alt>-<F10>, type Time Stamp, and press <Enter>.

Coria Gore
Ypsilanti, Michigan

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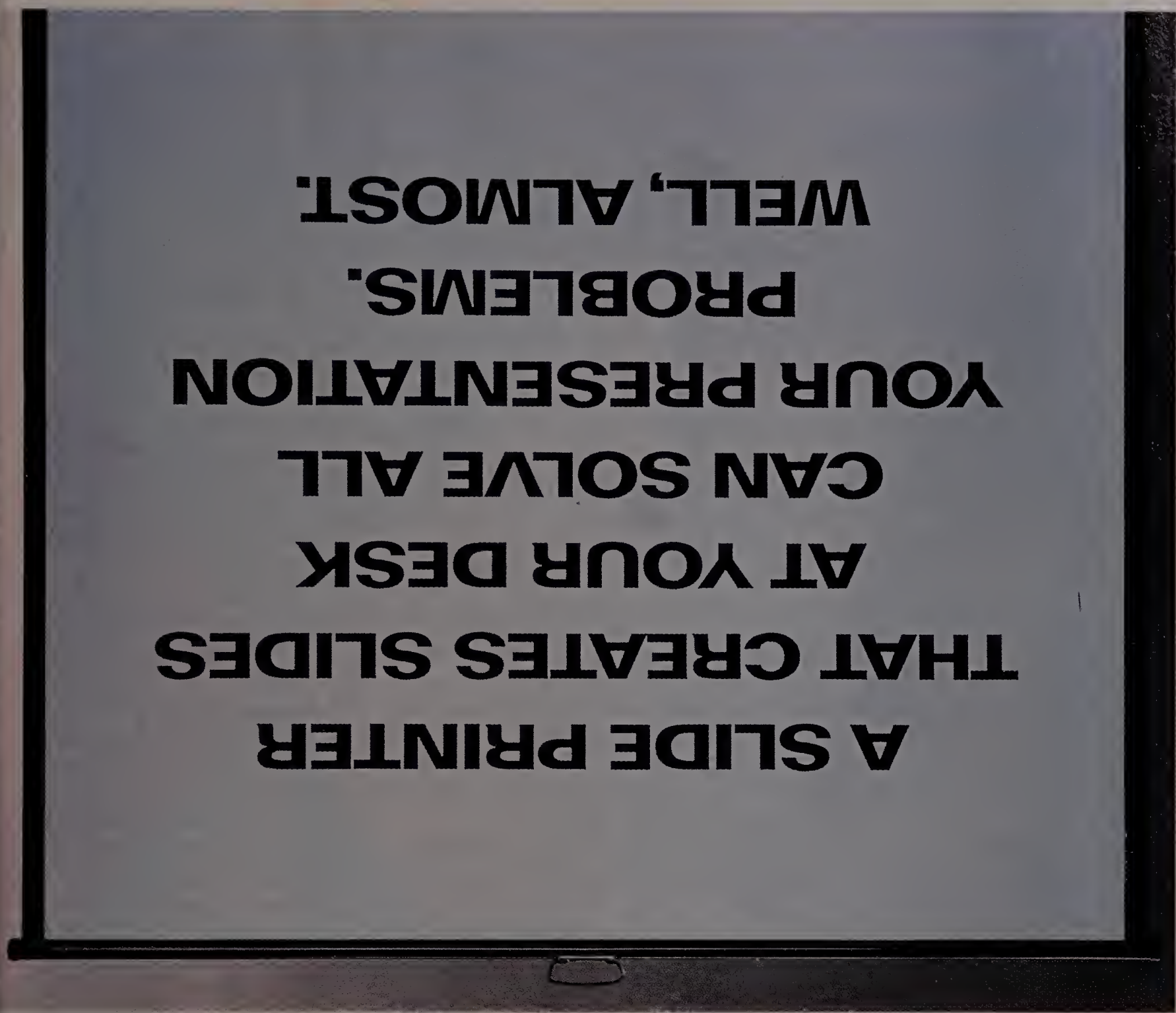

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DATA MANAGEMENT Q & A

Moving the Paradox Cursor

Q I use *Paradox 4.0* to manage our expense records. During data entry, is there a way to have the cursor automatically move to the next field after the current field is complete?
Morgan Bay, Phoenix

A Yes. While you're editing the table, choose *ValCheck•Define*, select a field, then select *Auto*. From the next menu, select either *Filled*, *Picture*, or *Lookup*, depending on whether you want the cursor to move when the field contents are at their maximum length, when they match a picture clause that you set up earlier with the ValCheck•Define•Picture command, or when you've completed a lookup. From then on, completing that field will automatically move you to the next.

Cleaning Up Data in Paradox

Q I do sales data analysis for a company that uses *Paradox*, and I depend on queries for my statistics. Unfortunately, the data has been entered inconsistently—for instance, there are state entries for both 'CA' and 'Ca'—and this confuses *Paradox* when the program tries to match and group information.

Right now I spend hours doctoring the data before running my queries and reports, and there's always new data to be fixed. Is there an easier way to make sure my data matches properly?
Howard Lee, Irvine, California

A As you've discovered, *Paradox* groups together only those values that match exactly. There are ways to ensure uniform data entry, but first let's look at the mess you need to clean up.

In the example you gave ('CA' and 'Ca'), you need to convert all the current entries to uppercase. You can do this with a short and simple PAL script such as CLEANUP.SC, which you'll find in **FIGURE 1.** On the assumption that State isn't the only field with inconsistent cases, CLEANUP also converts the Code field to lowercase and the Name field to *proper* case, where only the first letter in each word is uppercase. You'll want to revise the script to meet your needs.

CLEANUP.SC is an ASCII text file, and you can create it in any text editor. To use the one that comes with *Paradox*, select *Scripts•Editor•New* if you are using version 4 and *Scripts•Editor•Write* if you happen to be using something older. Or you can download CLEANUP.SC from the Featured in May folder on PC World Online.

As you type in the commands, substitute the name of your data table for the word "Table" in the fourth line, but keep the quotations around the word; for instance, if you need to fix your CUSTOMER table, the line should read **COEDIT "Customer"**. Insert, copy, or delete lines between the SCAN and ENDSCAN commands, and change the bracketed field names, to match your data and needs. Once you've written and saved the file, make a backup of your table, then use *Scripts•Play•Cleanup* to do your housekeeping.

When fixing the case isn't sufficient, a *changeto* query may do the trick. Say you have catalog numbers 'PJ 1234,' 'pj1234,' and 'Pj 1234,' all of which you need to look like 'PJ1234'. To fix these, do an *Ask* on your table. Don't check any fields for display, but move the cursor to the catalog number field and type **pj..1234, changeto PJ1234**. When you press **<F2>** to Do_It!, *Paradox* will correct the field in your table and put the unchanged data in a new table called CHANGED.

The '..' wild card does two jobs: First, it represents any string of characters, including a zero-length string. That way, *Paradox* will find any record where the field's first two characters are 'pj'

```
CLEAR
@ 22,40
?? "Cleaning up table...please wait"
COEDIT "Table"
SCAN
;next line converts Name to initial caps
[Name] = FORMAT("CC",LOWER([Name]))
;next line converts State to all caps
[State] = UPPER([State])
;next line changes Code to lower case
[Code] = LOWER([Code])
ENDSCAN
DO_IT!
```

FIGURE 1: CLEAN UP BADLY ENTERED DATA with your own version of this Paradox script.

USER GROUP TIP

Pizzazz in Paradox Reports

Want to make the title of a *Paradox* report boldface? Or change the font? By placing printer codes in calculated fields within reports, you can add variety to your hard copy's appearance.

To make a headline boldface, move the cursor to the line above the headline, press <F10>, and select Field • Place • Calculated. Between quotation marks, enter your printer's boldface code, using \027 for the untypeable Escape code—If you have an HP LaserJet, enter "\027(s5b". Repeat the process on the line below the headline, this time using the code to turn boldface off ("\027(s0B" on a LaserJet).

A few caveats: The Calculated field takes up space in your report layout; If you don't put it on a line of its own, it may affect how other fields line up. And don't shorten a printer code field; If you do, the printer may not receive all the instructions it needs. Finally, make sure you get the upper and lower cases exactly right; the printer won't stand for mistakes.

David Hodgson
Sacramento PC Users Group

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and last four characters are '1234', regardless of what—if anything—is in between. Second, it eliminates case sensitivity, so 'pj', 'PJ', and 'Pj' will all be found. You can do multiple changetos in one query, and you can even do more than one for the same field: Just move the cursor down a line and type in the other expression.

Even though these tips might help speed up your housekeeping, I'm sure you'd like to keep things clean from here on. The best way to ensure that data gets entered uniformly in the first place is to use *Paradox*'s validity checks. This feature lets you place limits on what data can get entered in a particular field, lets you control formatting (including capitalization), and lets users pop up a list of possible correct entries.

Talk to the person responsible for the database and request that they add validity checks, or get permission to add them yourself. You can add a validity check to a field while editing or entering data. Simply choose *ValCheck•Define*, and *Paradox* will prompt you through the process. Note that validity checks control data that's being added or edited, but they don't do anything to straighten an existing mess.

Avoiding Blank dBASE Report Pages

Q I have a *dBASE III Plus* program that prints out summary invoices for consignment sales to an HP LaserJet. When the printer runs out of paper, the program apparently keeps sending it the 'eject' code that follows each invoice; when I reload the printer and bring it on line, it spits out stacks of blank pages. How do I fix this?
Roscoe Howard, Acton, Massachusetts

A It sounds like your program may be in some kind of loop that sends form feeds to the printer while testing to see if it's ready. Short of changing the program code, try emptying the print buffer by turning the printer off before you add paper.

Repeating dBASE Data

Q I'm using *dBASE III Plus* to keep a record of my business expenses. I often enter several records for the same day, and I wonder if there is any easy way to tell *dBASE* to use the same date for all records entered after the first.
Shane Stevens, Chicago

A While there's no quick trick for copying one field value, you can easily tell *dBASE* to copy all the fields from the last record into each new record that is appended. Before adding new records to your database, at the dot prompt, enter the command **SET CARRY ON**. Then each new record will start as a copy of the last one, and you can just type over the fields you want to change.

By Celeste Robinson

PC World *contributing editor Celeste Robinson is the author of* Paradox 4.0 Handbook *(Bantam Computer Books, New York, 1992).*

Mail your questions to Data Management, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to the Data Management forum on PC World Online; CompuServe, 74055,412; MCI Mail, 179-3813; or 415/442-1891 (fax).* PC World *pays $50 for published questions. Sorry, we cannot acknowledge unpublished materials.* ■

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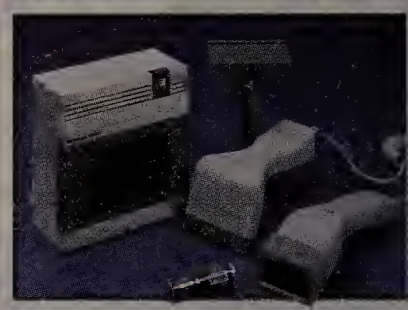

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Awarded for Version 1.1 — Rated #1, *PC Week*, May 14, 1990; Excellent Value, *InfoWorld*, May 22, 1989; Editor's Choice, *PC Magazine*, December 17, 1991; Readers' Choice, *DBMS*, December 1991; Best Buy, *PC World*, March 1990.

Awarded for Version 2.0 — Top 200 and Best Value, *PC Computing*, June and August 1992; 3-1/2 Stars, *Home Office Computing*, September 1992; Top 100, *PC Sources*, October 1992; Readers' Choice, *DBMS*, December 1992; Readers' Choice (Honorable Mention), *Data Based Advisor*, December 1992; Editor's Pick, *Home Office Computing*, January, 1993; Best of 1992, *PC Magazine*, January 1993.

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PUBLISHING & PRESENTATIONS MAKEOVER

Organization Within the Organization

Internal reports can be a vital source of information, yet all too often they get ignored because they're dense and unattractive. An appealing design and layout can't reduce the volume of information, but they can help organize the material so it gets attention.

The original document shown is part of a 25-page summary produced in *WordPerfect 5.1* by David Fickbohm, a lead analyst with a San Francisco–based transportation firm. The report, distributed to company executives, summarizes a week's worth of professional seminars that Fickbohm attended.

Mr. Fickbohm treated his descriptions consistently, with line spacing and type formats defining various elements. But the document is a study in the "infoglut" that corporate executives wade through every day. A strategic design can ease access to the material by breaking it into manageable pieces.

It's News to Them

Our redesign was done in *QuarkXPress for Windows*, but we could easily have accomplished it in a sophisticated *Windows* word processor. To help readers find information quickly, we adopted a newsletter format. The result is a more palatable document that suggests immediacy and importance. The four-column grid with left-aligned type enhances readability and cohesiveness. The left column holds summary and display elements—including one-sentence overviews, title bars, and graphics.

Summary titles are laid out in white type on a black background to draw the eye to the most important information. Shaded text boxes and passages from the document act as signposts to readers skimming the report. Distinctive icons also identify relevant material, and we've added a four-star rating system to summarize Fickbohm's impressions.

A Word About Type

A classic sans serif typeface—Helvetica—gives the report a clean, crisp feel. If you're using TrueType, you can get the same look with Arial, a Helvetica clone. The body text is 10-point type with 11.5-point line spacing. We used 14-point Helvetica Bold for the title bar and 10-point Helvetica Bold for the tint box to ensure the type would stand out when printed to a standard laser printer. We chose a 10-point bold italic for the summary opinions in the left-hand column, and moved up in size to 14 points for the text quotes.

The disk icon in the title bar and the stars come from *CorelDraw*'s clip art library. We designed the multiarrow icon in *CorelDraw* by creating a single line and placing arrowheads on either end. We then copied the item three times, rotating it 45 degrees each time, and placed a white circle in the center. The borders above and below the quotes in the text are 6-point lines across the length of the column. The tinted box was created with the frame tool in *QuarkXPress* and filled with a 10 percent gray tint.

Despite the airier look of the new layout, it accommodates more text per page than Fickbohm's original. Columns are just under 10 picas wide for readable line lengths, and set 0.167 inches apart. We left an ample 0.75-inch page margin to frame the material.

By David Brickley and Michael Desmond

Michael Desmond is an assistant editor for PC World. *The redesign was performed by David Brickley, a designer based in Moss Beach, California.*

Send business document and presentation make-over candidates, preferably clean and unfolded, to Publishing & Presentations, PC World, *501 Second St. #600, San Francisco, CA 94107. Mail your publishing or presentations questions to us at the above address, or send them electronically to the Publishing & Presentations forum on PC World Online; MCI Mail, RJANTZ; or 415/442-1891 (fax).* PC World *pays $50 for published questions and make-overs. Sorry, we cannot acknowledge unpublished materials.*

1 To create a point of immediate focus, we used reversed type on a black box for the seminar titles. The title is right-justified within the box, while the left side is reserved for icons that define the subject matter. We used images from *CorelDraw*'s clip art library and exported them as EPS files to *QuarkXPress*.

2 Logical placement keeps secondary information pertinent, while more important elements on the page receive emphasis. Here, we shrank the seminar speaker's name and affiliation to 7-point type.

3 The opinion blurb is a strong feature of each summary, which we stress by dedicating space in the left column. The 10-point bold italic type implies valuable information.

4 We use Helvetica for a clean and more graphic look.

5 We create a professional-looking document, taking advantage of the capsule summary format by using a four-column layout and split-page design. Columns are just under 10 picas wide for optimal readability, while asymmetrical text layout adds energy to the page.

6 Significant quotes from the text pull readers into the material and lighten the page. We use a 14-point Helvetica Bold italic that maintains continuity with the body text. Six-point rules separate the quote from text.

7 The sidebar provides an attractive way to present lists, tables, and other information. We created the box using the frame tool in *QuarkXPress* and set it to a 10 percent gray tint. To ensure quality laser output, we used 10-point Helvetica bold that holds up well against the gray background.

AFTER

1

The Bachman Analyst

2

Jackie Laver
Bachman Information Systems

3

This was a very good explanation of data modeling, along with an explanation of why to model, what should be modeled and an overview of how to model.

Models are approximations of the real information. They help you navigate through information. They highlight the most essential features. They represent data in a simplified but structured format.

From a business perspective they depict behavior, not implementation. They provide a common language and insulate the business from changes in technology.

You can model an enterprise, a process, or logic. Data modeling describes a business system and the data required to operate that system independent of hardware and software. A data model represents data and your knowledge of data (business rules). A model is graphically represented by entity-relationship diagrams. A data model complements a process submodel. Data is modeled by diagramming entities, attributes, relationships, partnership sets, and keys. Process modeling is a conceptual representation of the functions and business logic of an enterprise. It complements data modeling. It shows the content, structure, and relationships of information used by a system. A process model cannot exist without an associated data model. One or more process models can be associated with the same data model. Logic modeling captures the business rules. Logic modeling is typically associated with a procedural element. They describe the process logic for each primitive process. They create an easy-to-read graphical representation of business logic.

4

"Process modeling is a conceptual representation of the functions and business logic of an enterprise."

6

5

Application Development
The Five-Year Outlook

Adam Rin *The Gartner Group*

Mr. Rin's main point was that a cultural change will be needed in application development due to the increasing demands for faster quality information, increased productivity, etc.

The Gartner Group sees the next five years as a time of software evolution—a time of change in the industry, a time of action and hope. However, promises exceed reality. CASE tools will NOT pay for themselves in one or two years.

The Gartner Group sees the application development environment evolving toward multiple repositories at multiple levels. They see distributed development environments co-existing with client/server production environments. Aspects of integration will include User Interface Management with Management Technologies. A problem that The Gartner Group sees is that Knowledgeware's Computer Aided Software Engineering (CASE) tool parts exceed IBM's ability to integrate them. A selling point that the CASE tool vendors push is portability, the idea being that if you create an application using a certain CASE tool, that application can run on multiple platforms. The Gartner Group points out that a portable system is not necessarily open. The application is still dependent on the vendor being able to run on a certain platform. There should be no proprietary system services or software in a CASE tool.

There is currently lots of shelfware due to a lack of methodologies and training, an unwillingness to change, and a lack of commitment from upper management. The Gartner Group feels that prototyping, iterative development and requirements animation will be mandatory as supplementary methods to a formal requirements analysis model by 1996, not a replacement for it. These are NOT panaceas.

Five categories of CASE can be defined today:

1. Single-component CASE, upper and lower; some are still here
2. Interfaced, mix-and-match CASE, where most are today
3. Repository based, mix-and-match CASE AD/CYCLE
4. Integrated CASE—will not happen overnight

7

Page 1

BEFORE

AE-0002 **Application Development** Adam Rin, Th
The Five-Year Outlook
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5. Open CASE

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AE-1080 **The Bachman Analyst** Jackie Laver, Bachman Information Systems

A very good explanation of data modeling, along with an explanation of why to model, what should be modeled and an overview of how to model.

Models are approximations of the real information. They help you navigate through information. They highlight the most essential features. They represent data in a simplified but structured format. From a business perspective they depict behavior not implementation. They provide a common language and insulate the business from changes in technology.

You can model an enterprise, a process, or, logic. Data modeling describes a business system and the data required to operate that system independent of hardware and software. A data model represents data and your knowledge of data (business rules). A model is graphically represented by entity-relationship diagrams. A data model complements a process submodel. Data is modeled by diagramming entities, attributes, relationships, partnership sets, and keys. Process modeling is a conceptual representation of the functions and business logic of an enterprise. It complements data modeling. It shows the content, structure, and relationships of information used by a system. A process model cannot exist without an associated data model. One or more process models can be associated with

COMMUNICATIONS Q & A

Stifling Screechy Modems

Q The screeching sound from my modem's speaker is driving me insane. How do I turn it off? I'm told I need to do it through my communications software.
Antonia Clayburn, Sussex, England

A All modems once boasted volume control knobs. But as modems advanced, programmable commands gradually took on the duties of the volume control knob. Now most modems have eight programmable commands in place of the single outdated volume knob. How's that for progress?

If you want to silence the modem completely, look for your modem's initialization string in your communications software. It should be in one of the setup screens. It's a long string that begins 'AT' and ends '^M'. Somewhere in it you will find the command 'M1', 'M2', or 'M3'. Change it to M0. If you don't find any such command, just type **M0** into the string, but be careful not to splice it into the middle of a command.

If you want merely to lower the volume, look for the command 'L2' or 'L3'. Type in **L0** or **L1** instead. If either of those commands is already in the string, you've got the volume as low as it gets. You'll probably just want to shut up the modem completely by erasing any L commands and entering M0 instead. You will need to reinitialize the modem with your communications software's reinitialization command or simply reload the software.

Most modems have eight programmable commands in place of the single outdated volume knob. How's that for progress?

Shuttling WordPerfect Files by Modem

Q I want to modem *WordPerfect* files to another computer. Can I send the files as they are, or must I convert them to text files first? Will any of the protocols like XMODEM or YMODEM send the files without the conversion?
Hal Tritz, Fond Du Lac, Wisconsin

A First, the quick answer to your question: You don't have to do anything to the files prior to sending them with an error-checking protocol like XMODEM, assuming that the PC user on the other end has the same word processor as you.

There are only a few instances when you need to strip a word processing document of its formatting: if you want to upload the document into an E-mail message, if you're sending the file to a PC user who uses a word processor that can't read your word processor's files, or if you're going to post the document as a text file on an on-line service or BBS.

Your word processor either provides a utility for removing formatting characters (converting it to ASCII) or includes an option that allows you to save the file in a "text only" or "text only with line breaks" format. If you're uploading text to an E-mail message, you'll want to use the latter .

Once you strip the document of its formatting characters, you can upload it into an E-mail message with your communications software's ASCII transfer feature. Generally, you don't want to use ASCII transfer for anything other than uploading text into an E-mail message since it offers no error checking. For other purposes, you'll want to use a protocol like XMODEM, YMODEM, or one of the others that provide error detection.

Take note: If you're using a *Windows* word processor such as *Word for Windows*, make sure the lines in the document are short enough to fit comfortably in the E-mail message to which you're uploading the document. Documents created in a small font often translate to lines of absurd length when converted to ASCII.

V-Series Befuddlement

Q My Hayes V-series 9600-bps modem needs to be repaired. Hayes told me I can turn it in for a V.32/V.42 9600-bps upgrade for $50, which is much better and faster. Why would it be? Will the $50 upgrade be worth it?
Denise Kidd, Nashville

A Hayes introduced its V-series modems before the modem world settled on a standard for transmission at speeds of 9600 bps and higher. Old V-series modems will talk only to other Hayes V-series modems at high speeds. The V.32 standard is the high-speed transmission scheme that everyone eventually agreed on, and V.42 is the error-trapping and compression scheme that emerged around the same time.

Upgrade to these standards, and your modem will not only be faster, it will finally be able to talk to most other high-speed modems (exceptions include U.S. Robotics single-standards). Hayes upgrade policies for old V-series modems vary according to the make and model. The upgrade cost may be as low as $50 if the modem needs only new firmware, or up to $329 if new hardware is required. Paying $329 for an upgrade is not advised, since you can buy a 9600-bps fax-modem for about $310. But if $50 is all it will cost you, then do it.

By Judy Heim

Judy Heim is a contributing editor for PC World *and the editor of* Online Investor, *a newsletter about using on-line services to track and manage investments.*

Mail your communications questions to Communications Q&A, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to the Communications forum on PC World Online; CompuServe, 75300,713; MCI Mail, 312-7737; GEnie, JUDY.HEIM; Internet, 3127737@mcimail.com; or 415/442-1891 (fax).* PC World *pays $50 for published questions. Sorry, we cannot acknowledge unpublished materials.*

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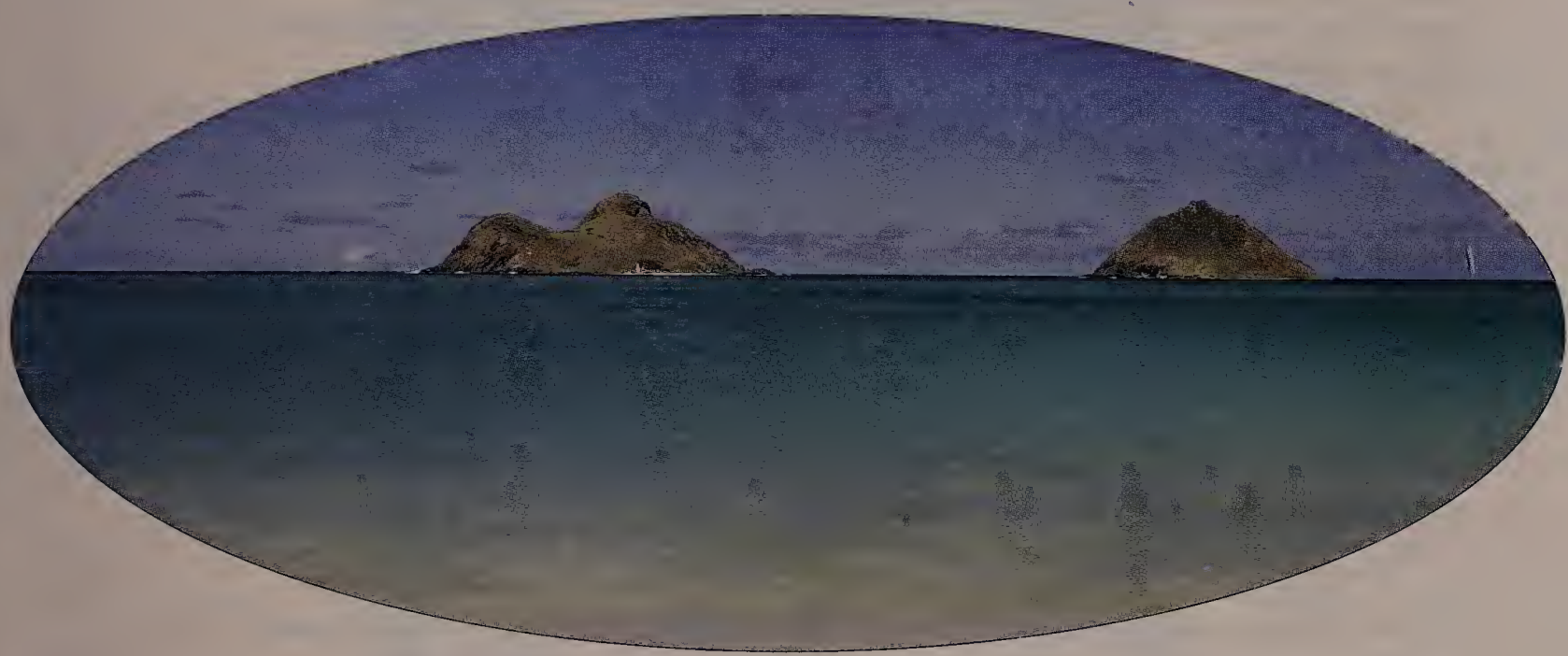

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Circle 246 on reader service card

STAR-DOT-STAR TIPS

Undoing Your Taxes In 1-2-3

When I go through my records every year at tax time, I need to know how much I've paid in state sales tax. Unfortunately, many of my records, including my bank and credit card statements, show the total amount paid but don't divide each purchase into price and sales tax.

I therefore created a simple way to calculate the sales tax automatically after the fact. I record each sale in a table that lists the item, the total for the transaction, and whether the sale is taxable [**FIGURE 1**]. The tax rate goes in a cell outside the table, which I named **SalesTax** with the help of the */Range•Name•Create* command. Columns E and F use formulas to reverse the sales tax calculation that was performed at the cash register, separating price from sales tax. The formula for E6 is **@IF(@UPPER(D6)<>"Y",C6,C6/(1+$SALESTAX))**, and for F6 it's **+C6-E6**. It's then a simple matter to copy these formulas down their columns.

Sue Franklin, New Orleans

Editor's note: If you're allowed to deduct state sales taxes on your state return, this is a great way to "back into" separate amounts for the net cost and the sales tax. It's worth noting that Ms. Franklin uses a named range to identify the cell containing her tax rate, making her formulas easier to read and saving her from having to remember the cell's address. By putting the dollar sign in front of the range name in her formula, she allows the table to be copied to any part of the spreadsheet, adjusting for the positions of the fields in the table, while maintaining SalesTax as a fixed location. A sample worksheet, SALESTAX-.WK1, is available in the Featured in May folder on PC World Online.

	A	B	C	D	E	F
1	Sales tax rate					
2	5.50%					
3						
4	Item	Total		Taxable?	Price	Tax Paid
5	----------					
6	Ski Wax		15.00	Y	14.22	0.78
7	Bungee Cords		23.99	Y	22.74	1.25
8	Rollerblades		88.99	Y	84.35	4.64
9	Bandages		109.15	Y	103.46	5.69
10	Doctor Bills		1283.57	N	1283.57	0.00

FIGURE 1: CALCULATE YOUR SALES TAX for income tax purposes from several total payments with this 1-2-3 worksheet.

Counting Pages In WordPerfect . . . Continued

In your November 1992 column, you provided a useful *WordPerfect* macro to create a footer saying "Page *x* of *y* pages." The footer normally does just that, but when I happened to apply it to a 19-page document, I discovered that it printed "Page 19 of 18 pages" on the last page.

The problem is that the macro determines the number of pages before a footer exists. In my document, which was just under 18 full pages before I ran the macro, the new footers were enough to add one more page to the document.

To correct this problem, I rewrote the macro to number every page first. This makes the document the same length it will be after the footers are created. Then, I make the macro create a footer with the words "Page *x* of *y* pages," as in your article. Finally, the macro deletes the regular page numbers. The result is a total page count that is always correct.

William A. Barnett, Napa, California

Editor's note: The more pages you have in your document, the more likely that the original macro we published will prove incorrect. Mr. Barnett's macro (see **FIGURE 2**) solves this problem. You can build on this macro to create more complex ones that need to know the number of pages in a document.

```
{DISPLAY OFF}
{Home}{Home}{Home}{Up}
{Format}PNP6{Exit}
{Home}{Home}{Home}{Down}
{ASSIGN}LastPage~{SYSTEM}Page~~
{Goto}{Goto}
{ON NOT FOUND}{GO}Top~~

{Search Left}{Format}PFA{Search}
{IF}{STATE}&512~
  {Backspace}
{ELSE}
  {Backspace}Y
{END IF}
{GO}MakeFoot~

{LABEL}Top~
{Home}{Home}{Home}{Up}

{LABEL}MakeFoot~
{Format}PFAP
Page {^B} of {VARIABLE}LastPage~
{Exit}{Exit}
{Home}{Home}{Home}{Up}
{Reveal Codes}{Right}{Del}{Reveal Codes}
{Goto}{Goto}
```

FIGURE 2: THIS WORDPERFECT MACRO COUNTS DOCUMENT PAGES more precisely than the one that appeared in our November 1992 issue.

Since this *WordPerfect* macro uses special commands, you can't create it by simply recording keystrokes; you have to use the macro editor. To get to the editor, press **<Home>**, then **<Ctrl>-<F10>**. At the Define Macro prompt, type **ALTP** (assuming that you want to run this macro by pressing <Alt>-P), and press **<Enter>**. At the Description prompt, type **Total Page Number in Footer** and press **<Enter>** again. You're now ready to create the macro.

In the *WordPerfect* macro editor, you

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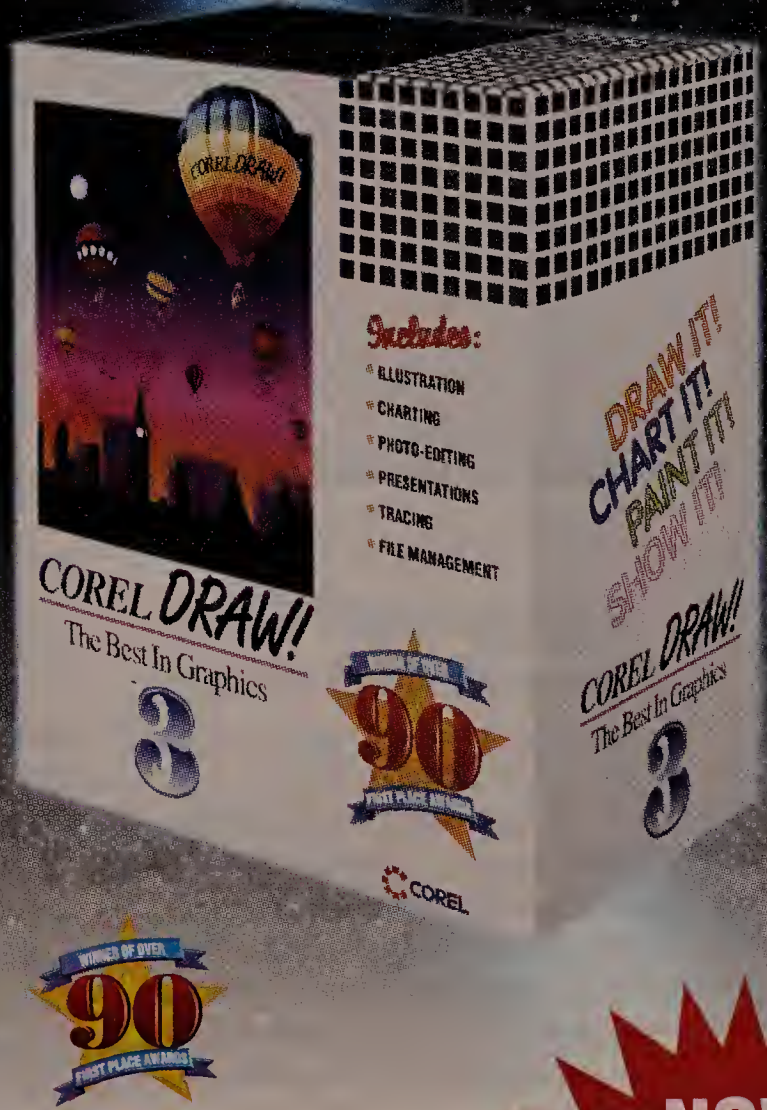

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must insert different types of commands in different ways. To insert a command shown here in **boldface**, press **<Ctrl>-<Page Up>**, select the command from the pop-up list in the upper right corner of the screen, and press **<Enter>**. If a command is shown underlined, press the appropriate key (for example, **<F2>** for {Search}). For commands that are **boldfaced and underlined**, press **<Ctrl>-V**, then the appropriate key (for example, **<Ctrl>-V** and **<Enter>** for **{Enter}**). Type any other text as it appears. When you're finished entering the macro, press **<F7>** to save it. You'll find ALTP.WPM in the Featured in May folder on PC World Online.

Is It Ready Yet?

If you've ever written a batch file that involved floppy access, you know what happens if the drive is accidentally left empty: Your user gets a most unfriendly 'Not ready error reading drive A:' message. The 'Abort, Retry, Fail?' options aren't necessarily the most helpful ones you can give a novice user.

In order to give your users a different kind of message, you need to trap the DOS "critical error," which, unfortunately, is one of the few errors that the ERRORLEVEL command won't help you with. So I wrote a program, DSKRDY.EXE, to trap this error for your batch files. DSKRDY (Disk Ready) can check both the A: and B: drives for a ready condition, and then return the drives' status via ERRORLEVEL.

When you call DSKRDY from a batch file, you can pass a drive letter (without a colon) to it as a parameter, or offer no parameter to have it check both A: and B:. After using DSKRDY, your batch file should check for ERRORLEVEL 4, which the program returns if a critical error other than "drive not ready" occurs when accessing the drive, or if the program can't return to the current directory. You then check for the ERRORLEVEL, which will confirm that the drive is ready. DSKRDY returns the following codes to ERRORLEVEL:

0 = Neither A: nor B: is ready
1 = A: is ready
2 = B: is ready
3 = Both A: and B: are ready
4 = Unexpected critical error

Charles J. Abbey, New Paltz, New York

Editor's note: Mr. Abbey's original utility was written for an unusual C compiler, so I rewrote it in *Turbo Pascal* (that program's built-in facilities for handling critical errors make such a utility a snap to create).

To create the program, copy **FIGURE 3** to an ASCII text file called DSKRDY.PAS in the current directory. Then, compile the program by typing **TPC DSKRDY** at the DOS prompt. DSKRDY.EXE will appear in the current directory.

To use DSKRDY in your batch file, simply invoke it and use IF ERRORLEVEL statements to test the results. **FIGURE 4** shows a sample batch file, called IFAREADY-.BAT, which executes a command, passed to it as a parameter, if and only if the A: drive has a disk in it.

The source code (DSKRDY.PAS), the compiled program (DSKRDY.EXE), and the sample batch file (IFAREADY.BAT) are all available in the Featured in May folder on PC World Online.

```
program DiskReady;

{$I-}

var
  oldDir, firstParm : String;
  letter : Char;
  errorLevel : Byte;

begin
{At start, assume no disks in drives}
errorLevel := 0;
{Save old directory}
GetDir(0,oldDir);
{Check parameter, if any, for drive letter}
firstParm := ParamStr(1);
if Length(firstParm) <> 1 then
  letter := ' '
  else
  letter := UpCase(firstParm[1]);
{Test drive A, if required}
if (letter <> 'B') then
begin
  {Try to make it current}
  ChDir('A:\');
  case IOResult of
    0: errorLevel := 1; {Disk in drive}
    152 : {Do nothing}; {Not ready}
    else
    errorLevel := 4 {Unknown error}
    end
  end;
{Test drive B, if required}
if (letter <> 'A') and
   (errorLevel <> 4) then
   begin
  ChDir('B:\');
  case IOResult of
    0: errorLevel := errorLevel + 2;
    152 : {Do nothing};
  else
    errorLevel := 4
    end
  end;
ChDir(oldDir);
if IOResult <> 0 then
  errorLevel := 4;
Halt(errorLevel)
end.
```

FIGURE 3: BUILD FRIENDLY MESSAGES about open floppy drives into batch files with a Turbo Pascal program.

Dot Your Lines In CorelDraw

CorelDraw allows you to outline objects with several kinds of dotted and dashed lines, but sometimes none of the built-in

```
@ECHO OFF
DSKRDY A
IF ERRORLEVEL 4 GOTO OOPS
IF NOT ERRORLEVEL 1 GOTO NOTRDY
%1 %2 %3 %4 %5 %6 %7 %8 %9
GOTO DONE
:NOTRDY
ECHO Drive A: not ready!
GOTO DONE
:OOPS
ECHO Unexpected critical error
ECHO accessing Drive A:
ECHO Operation aborted!
:DONE
```

FIGURE 4: THIS BATCH FILE, IFAREADY, executes a command only if the A: drive is ready.

QEMM Safety in Numbers

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The more memory you have, the more reliability you get. No other memory manager measures up to QEMM's performance.

PC Week Ratings	All Charge 386 3.2	Netroom 2.10	QMAPS 2.0	386Max/ BlueMax 6.00	QEMM 6.01 Analyst's Choice	Memory Commander 2.1
Software Compatibility	Satisfactory	Good	Needs Improvement	Satisfactory	Good	Satisfactory
Hardware Compatibility	Satisfactory	Good	Satisfactory	Satisfactory	Good	Satisfactory
Reliability	Needs Improvement	Satisfactory	Needs Improvement	Satisfactory	Good	Needs Improvement
Ease of Use	Satisfactory	Good	Satisfactory	Good	Good	Satisfactory
Memory Management Flexibility	Satisfactory	Good	Satisfactory	Good	Good	Satisfactory
Quality of Documentation	Satisfactory	Satisfactory	Satisfactory	Good	Satisfactory	Satisfactory

Good · Satisfactory · Needs Improvement

PC Week carefully compared them all and rated QEMM-386 v6 the best memory manager.

This is what QEMM-386 does for a typical PC. It reorganizes memory to produce greater speed and safety.

Nobody Knows Memory Like We Know Memory.

That's not bragging, just fact. As recently as two years ago, DOS ignored the importance of maximizing conventional memory. At that time, our QEMM-386 v5 provided up to 128K more usable memory. QEMM became a virtual necessity for 'power users.'

Today, our latest QEMM-386 version 6 surpasses even that achievement. Thanks to our new, smart 'stealth' technology, it finds as much as 96K more high memory than other memory managers. And speaking of other memory managers, not one has yet been able to match our performance. Instead, some have slashed prices or started nasty rumors just because they couldn't reliably deliver the same results. These tactics must not work, since we outsell all the others put together.

QEMM. The Memory Manager Millions Rely on Every Day.

Considering its unsurpassed performance and the safety it adds to your system, it's no wonder that millions of PC owners use QEMM. And it should be no surprise that 'gurus' and MIS managers consistently vote QEMM-386 the top memory manager in poll after poll, year after year.

QEMM has won more recognition than all other memory managers combined.

Protect Your Productivity; Keep Your Work Safe.

Any task, from programming to writing the company business plan to composing a personal letter, takes time and thought. Your PC is supposed to make that process easier; your output better. When you can't run your favorite grammar-checking TSR or have to get by without a vital network utility, you're sacrificing productivity.

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Circle 189 on reader service card

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PC WORLD

patterns are appropriate for your application—for instance, a clip-out coupon or a rubber stamp. If you find that the dashes are too short (or the spaces too wide) for your liking, there's an easy way to add new, custom patterns.

Setting up your own dotted-line pattern involves altering an ASCII text file called CORELDRW.DOT, which you'll find in your CORELDRW directory. Before you do anything else, make a copy of that file for safety's sake, then load CORELDRW-.DOT into Notepad or any other text editor. Start a new line (preferably at the beginning or the end of the file, so you can easily spot your new dashed line in the program), and type the numbers **2 3 1**, including the spaces. Save the file.

The next time you start *CorelDraw*, you'll see a line option that gives you dashes that are three units wide, with one-unit spaces in between (the size of the unit is based on the current stroke weight).

Ed Yap, New Manila, Quezon City, Philippines

Editor's note: According to Corel, the format of each line in CORELDRW.DOT is as follows: The first number, which can range from 2 to 10, tells the program how many values (after itself) are on that line. The next number gives the length of a line segment, and the one after that the length of the space after the segment. Any numbers after that define subsequent lines and spaces. Thus, the line '4 1 5 2 6' would define a line style consisting of a segment one unit long, a space five units long, another segment two units long, and another space six units long. To help you remember

POWERTIP no.282

WinWord Macro Library

If your *Word for Windows* macros have functions and subroutines that you'd like to use in other *Word for Windows* macros, you can. For instance, to run OtherMacro's GoodSub routine in the macro you're currently editing, type the command OtherMacro.GoodSub. To run OtherMacro in its entirety in the current macro, type OtherMacro.Main.

Lincoln Spector
Associate Editor

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```
@break off
@echo off
if exist C:\BOOT.TXT goto log
echo ---- Boot Log ---- > C:\BOOT.TXT
:log
echo.| time | find "Cur" >> C:\BOOT.TXT
SECRET.COM
break on
```

FIGURE 5: FOR EXTRA SECURITY, add this batch fragment to your AUTOEXEC.BAT file.

what those cryptic numbers are, you can put comment lines in CORELDRW.DOT by starting them with semicolons (;).

Logging Log-ins

For security reasons, I created a batch file routine to tell me if my computer was booted when I wasn't there, and to keep track of how many times I boot up [**FIGURE 5**]. I run the routine in my AUTOEXEC.BAT file, where it first logs the time of each boot into a file called BOOT.TXT, then invokes SECRET.COM, a simple security program I read about in an early *Star-Dot-Star* column, to prevent unauthorized users from accessing the machine.

Marc Dent, Norcross, Georgia

Editor's note: Aside from being a useful tool on its own, this batch routine demonstrates how to use DOS's TIME command to track when events occur. The trick is to use DOS's ECHO command, followed immediately by a period, to simulate a carriage return; the result is "piped" into the TIME command and then into FIND, which extracts the line containing the current time. The resulting text can be appended to a log file for later inspection.

This batch fragment wouldn't provide much security at all had the author not included SECRET.COM, because an intruder could easily modify or delete the log it creates once he or she gained access to the system. While the fragment shown in Figure 5 won't give you 100 percent security, it will foil many intruders and let you know that they tried to boot and use your system when you weren't around.

To create SECRET.COM, copy **FIGURE 6** to an ASCII text file called SECRET.SCR, then double-check the code to be sure there aren't any errors; I recommend checking by reading down the columns rather than across them.

There is one change you should make in the listing: Replace the word 'Password' with your own, eight-character, case-sensitive password within single quotation marks. Once the file is saved and checked, type **DEBUG<SECRET.SCR** at the DOS prompt to create SECRET-.COM. The batch routine (named AUTOEXEC.FRG), SECRET.SCR, and SECRET.COM are all available in the Featured in May folder on PC World Online.

By Brett Glass

Brett Glass is a contributing editor for PC World.

Have a macro, batch file, short program, or general tip you're proud of? Mail your tips to Star-Dot-Star, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to the Star-Dot-Star forum on PC World Online; CompuServe, 74055,412; MCI Mail, PC World Editorial; Internet, rogue@well.sf.ca.us; or 415/442-1891 (fax).* PC World *pays $25 to $200 for each tip used. Sorry, we cannot acknowledge unpublished materials.*

```
N secret.com
E100 8E 48 01 E8 30 00 C6 06 47 01 00 8F 7C 01 B9 08
E110 00 32 E4 CD 16 3A 05 74 04 FE 06 47 01 BE 7A 01
E120 E8 13 00 47 E2 EB BE 6A 01 80 3E 47 01 00 75 01
E130 C3 E8 02 00 EB CA B4 0F CD 10 FC AC 3C 24 74 06
E140 B4 0E CD 10 EB F4 C3 00 0D 0A 45 6E 74 65 72 20
E150 38 2D 63 68 61 72 61 63 74 65 72 20 41 63 63 65
E160 73 73 20 43 6F 64 65 3A 20 24 0D 0A 41 63 63 65
E170 73 73 20 64 65 6E 69 65 64 24 2A 24
A17C
DB 'Password'

RCX
84
W
Q
```

FIGURE 6: SECRET.COM PASSWORD-PROTECTS your AUTOEXEC.BAT file. The Figure 5 batch fragment uses this program.

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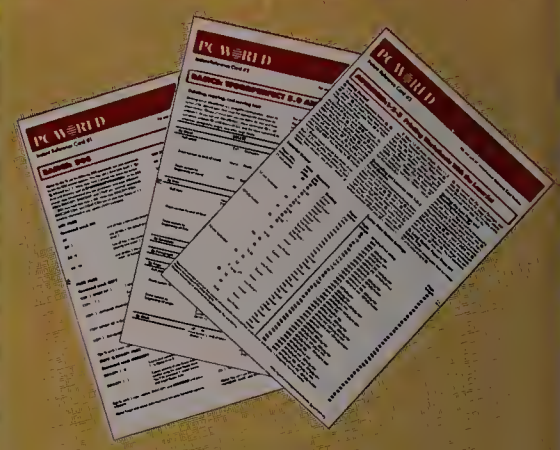

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MICROSOFT DOS 6.0: THE COMMAND LINE

You issue a DOS command by typing it at the DOS prompt (which usually looks like A:\>, C:\>, or C:\DOS>) and pressing <Enter>. The prompt's first letter indicates the *default drive*; the character(s) between the : and the > indicate that drive's *default directory*. (Every drive has a default directory.) Directories contain files and other directories (often called subdirectories or child directories). The \ represents the *root*, or top-level, directory. Except for the root, each file and directory name is one to eight characters long, optionally followed by a period and an extension of up to three characters. The sequence of directory names from the root to a given subdirectory—for example, \ARTICLES\PCWORLD\MAY—is called the *path* (note that a \ separates *parent* and *child* directories). To define a command further, you usually type *parameters* or *switches* before pressing <Enter>. In file (and in some cases, directory) name parameters, you can use a question mark to mean any single character and an asterisk for any subsequent number of characters. For example, *.* (the default when you omit a file name parameter) matches every file, AB*.? matches every name that begins with AB and has an extension of one character or less, and C?E.* matches every name, with or without an extension, that's three characters long, begins with C, and ends with E. When you omit a parameter (or a part of a parameter), DOS uses the parameter's (or the part's) current default, if any.

Note: Keys to press are shown here in **boldface.** Keys to press simultaneously are joined by a hyphen. *Italic* indicates an entry you must provide (such as *d:* for your chosen drive), except when shown within square brackets, indicating the entry is optional (do not type the brackets). This instant reference card is the first of two on DOS 6.0; IRC #37 will detail the utilities included with DOS 6.0.

Fold Here

ENTERING COMMANDS

Abandon entry	**<Esc>**
Pause running command	**<Ctrl>-S** or **<Pause>**
Resume paused command	**<Ctrl>-S** or *character*
Abort running command	**<Ctrl>-C** or **<Ctrl>-<Break>**
Get brief help for command	*command* **/?**
Get more help for command	**HELP** *command*
Specify command's directory	*[d:\path\]command*

USING DOSKEY

DOSKEY lets you edit the command line, display previous commands, and create DOS macros (your own commands that perform one or more DOS commands). Enter the command **C:\DOS\DOSKEY** to install DOSKEY.

Move cursor one character left/right	**<Left>/<Right>**
Move cursor one word left/right	**<Ctrl>-<Left>/<Ctrl>-<Right>**
Move to beginning/end of command	**<Home>/<End>**
Toggle insert/overtype	**<Insert>**
Delete characters to beginning/end	**<Ctrl>-<Home>/<Ctrl>-<End>**
Display previous/next command in command history buffer	**<Up>/<Down>**
Display first/last command in buffer	**<Page Up>/<Page Down>**
Display most recent command starting with *character(s)*	*character(s)***<F8>** (repeat **<F8>** to display previous matching commands)
Display all commands in buffer	**<F7>**
Display *n*th command	**<F9>***n*
Clear command history buffer	**<Alt>-<F7>**
Create DOS macro	**DOSKEY** *macroname=text* (e.g., DOSKEY D=DIR $1 /P)
Delete DOS macro	**DOSKEY** *macroname=*
Clear all macro definitions	**<Alt>-<F10>**

CHANGING/CHECKING DEFAULTS AND SETTINGS

Change default drive	*d:* (e.g., A: or C:)
Set default directory	**CD** *d:\path* (**CD** for default drive's root)
Check or set system date/time	**DATE** *[mm/dd/yy]*/**TIME** *[hh:mm:ss]*
Set list of directories for DOS to search for commands not found in default directory of default drive	**PATH** *d:\path1[;d:\path2[;d:path3[...]]]* (semicolons, not spaces, separate directories)
Show default drive and directory, greater-than (>) symbol in prompt	**PROMPT pg**
Check memory usage	**MEM** (**MEM /C** for detail)

MANAGING FILES AND DIRECTORIES

List files and directories, each with size and date and time last changed	**DIR** *[d:\path\filename.ext] [/P]* (/P pauses list at each screenful)
Copy file	**COPY** *d:\path\filename.ext d:\path\filename.ext*
Compare file to its copy	**COMP** *d:\path\filename.ext d:\path\filename.ext*
Move file	**MOVE** *d:\path\filename.ext d:\path*
Copy files and subdirectories of default directory, if not specified	**XCOPY** *d:\path\filename.ext d:\path\filename.ext* **/S**

Fold Here

Delete file	**DEL** *d:\path\filename.ext*
Rename a file without copying it	**REN** *d:\path\filename.ext newname.ext*
View contents of text file	**TYPE** *d:\path\filename.ext*
Edit contents of text file	**EDIT** *d:\path\filename.ext*
Set read-only, hidden attributes (use - instead of + to clear attribute)	**ATTRIB +R +H** *d:\path\filename.ext*
Make new directory	**MD** *d:\path\newdir* (child if *\path* omitted)
Delete empty, nondefault directory	**RD** *d:\path*
View directory tree structure	**TREE** (**TREE /F** includes file names)
Delete child directory and contents	**DELTREE** *d:\path* **• Y**
Check integrity of default drive's files	**CHKDSK**
Fix file errors during check	**CHKDSK** *[d:]* **/F**

MANAGING DISKS

Format bootable floppy disk	**FORMAT A: /S** or **FORMAT B: /S**
Format 360K/720K floppy	**FORMAT A: /F:360/FORMAT B: /F:720**
Label disk	**LABEL** *[d:newlabel]*
Duplicate disk exactly	**DISKCOPY** *d: d:*

USING FILTERS AND REDIRECTION

Use text file for command's input	*command* **<** *d:\path\filename.ext*
Put command's screen output in file	*command* **>** *d:\path\filename.ext*
Add command's screen output to file	*command* **>>** *d:\path\filename.ext*
Search file for *text*	**FIND** *"text" d:\path\filename.ext*
Pause command's output by screenful	*command* **| MORE**
Display text file in screenfuls	**MORE <** *d:\path\filename.ext*
Sort lines of text file	**SORT** *d:\path\filename.ext*

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MICROSOFT DOS 6.0: THE SHELL

DOS Shell is a graphical alternative to the command line. You issue commands primarily via <Alt>- and <Ctrl>-*key* combinations and drop-down menus. Launch DOS Shell with the command **DOSSHELL**. The program displays a menu bar at the top and a status bar at the bottom. In between, by default, are the Drive Icon, Directory Tree, File List, and Program List areas. The File List shows the names of the files in the Directory List's selected directory. The Program List shows the names of the current group's programs and subgroups.

Note: Keys to press are shown here in **boldface**. Keys to press simultaneously are joined by a hyphen. A bullet (•) links menu and option names in a series. Commands begin within DOS Shell unless otherwise noted.

MANAGING THE DOS SHELL

Get context-sensitive help	Select item, **<F1>**
Open menu	**<Alt>** or **<F10>**, type first letter of menu name; or click with mouse
Select command	Open menu, type highlighted letter; or click with mouse
Activate next/previous area	**<Tab>**/**<Shift>–<Tab>**; or click with mouse
Select drive	**<Ctrl>–***d;* or click icon; or activate Drive Icons area, cursor to icon, **<Enter>**
Update Directory and File Lists	**<F5>**; or **View** • **Refresh**; or double-click drive icon
Show one Directory Tree and File List set	**View** • **Single File List**
Show two Directory Tree and File List sets	**View** • **Dual File Lists**
Show all selected drive's files	**View** • **All Files**
Show Directory, File, and Program Lists	**View** • **Program/File List**
Show Program List only	**View** • **Program List**
Move to top/bottom of active list	**<Home>**/**<End>**
Move to next item in active list beginning with *character*	*Character*
Set/unset which operations request confirmation	**Options** • **Confirmation**, check/uncheck operations, OK
Set number of screen lines, mode	**Options** • **Display**, select mode, OK
Exit <Shift>-<F9> DOS prompt	**EXIT<Enter>**
Quit DOS Shell	**<F3>**; **<Alt>–<F4>**; or **File** • **Exit**

MANAGING PROGRAMS AND GROUPS

Unless noted, begin these commands by first activating Program List.

Select program/group	Cursor to or click
Launch program or open group	Select program or group name, **<Enter>** or **File** • **Open**; or double-click program name
Add program to active group	**File** • **New** • Program Item, OK, type title and commands and startup directory, OK
Add group to active group	**File** • **New** • Program Group, type title, OK
Delete selected program/group	**<Delete>** or **File** • **Delete**, OK
Rename selected program/group	**File** • **Properties**, type new title, OK
Copy selected program	**File** • **Copy**, select new group, **<F2>**
Show properties of selected program/group	**File** • **Properties**
Change position in list of selected program/group	**File** • **Reorder**, cursor to location, **<Enter>**

MANAGING PROGRAMS AND GROUPS (continued)

Return from active program*	**<Ctrl>–<Esc>**
Launch program, stay in Shell*	Hold down **<Shift>**, launch program
Cycle forward/backward from active program*	Hold down **<Alt>**, **<Tab>**/**<Shift>–<Tab>** through programs

*Enable Task Swapper first with **Options** • **Enable Task Swapper**.

MANAGING FILES

Select single file	Cursor to or click files
Select adjacent files	Select first files, hold down **<Shift>**, select last file
Select/deselect nonadjacent files	Hold down **<Ctrl>** while clicking files; or select first file, **<Shift>–<F8>**, use cursor keys and **<Space>** to select/deselect files, **<Shift>–<F8>** when finished
Enable/disable file selection across directories	**Options** • Select **Across Directories**
Select files across directories	Enable selection across directories, select directory in Directory Tree, select files in its File List, select another directory in same tree or second Directory Tree, select files in its File List, and so on
Select/deselect all files in active File list	**<Ctrl>–<Slash>**/**<Ctrl>–<Backslash>**; or **File** • **Select All/Deselect All**
Print selected file(s)**	**File** • **Print**
Associate file with program	**File** • **Associate**, type extension, OK
Copy/move selected file(s)	**<F8>**/**<F7>**, type path, OK
Delete selected file(s)	**<Delete>** or **File** • **Delete**, Yes
View selected file	**<F9>**; or **File** • View File Contents
Find file(s)	**File** • **Search**, type file name (? and * allowed, see introduction on other side of card), OK
Rename selected file	**File** • **Rename**, type name, OK
Edit selected text file	Launch Editor from Main group, OK
Load selected file in associated program	**File** • **Run**, type command line, OK
Set File List's sort order	**Options** • **File Display Options**, select order
Show all drive's files	**View** • **All Files**
Show selected file's information	**Options** • **Show Information**
Set selected file's attributes	**File** • Change Attributes

**To print from Shell, enter the PRINT command before launching Shell.

MANAGING DIRECTORIES

Select directory	Click icon or name, or cursor to name
Create directory	**<Tab>** to Directory List, select parent, **File** • **Create Directory**, type name, OK
Delete empty directory	Select directory, **<Delete>** or **File** • **Delete**
Rename selected directory	**File** • **Rename**, type name, OK
Expand branch one level	Double-click parent; or select parent, **+** or **Tree** • **Expand One Level**
Expand branch fully	Select parent, * or **Tree** • **Expand Branch**
Expand all branches	**<Ctrl>–*** or **Tree** • **Expand All**
Collapse branch	**Tree** • **Collapse Branch**

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2	○	○	○	○	○	○	○	○	○	○	○
3	○	○	○	○	○	○	○	○	○	○	○
4	○	○	○	○	○	○	○	○	○	○	○
5	○	○	○	○	○	○	○	○	○	○	○
6	○	○	○	○	○	○	○	○	○	○	○
7	○	○	○	○	○	○	○	○	○	○	○
8	○	○	○	○	○	○	○	○	○	○	○
9	○	○	○	○	○	○	○	○	○	○	○
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Star-Dot-Star (page 256)	○	○	○	○	○	○	○
Instant Reference Card: DOS 6.0 (page 263)	○	○	○	○	○	○	○
Business Fixtures (page 295)	○	○	○	○	○	○	○
Break Time (page 299)	○	○	○	○	○	○	○
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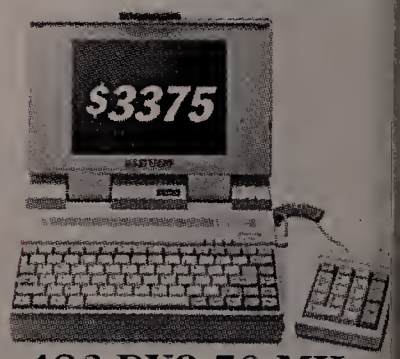

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Color 486 DX2-50 MHz
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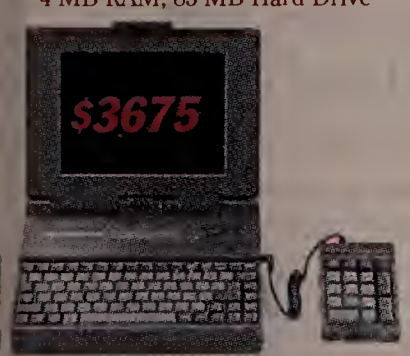

Color 486 DX2-50 MHz
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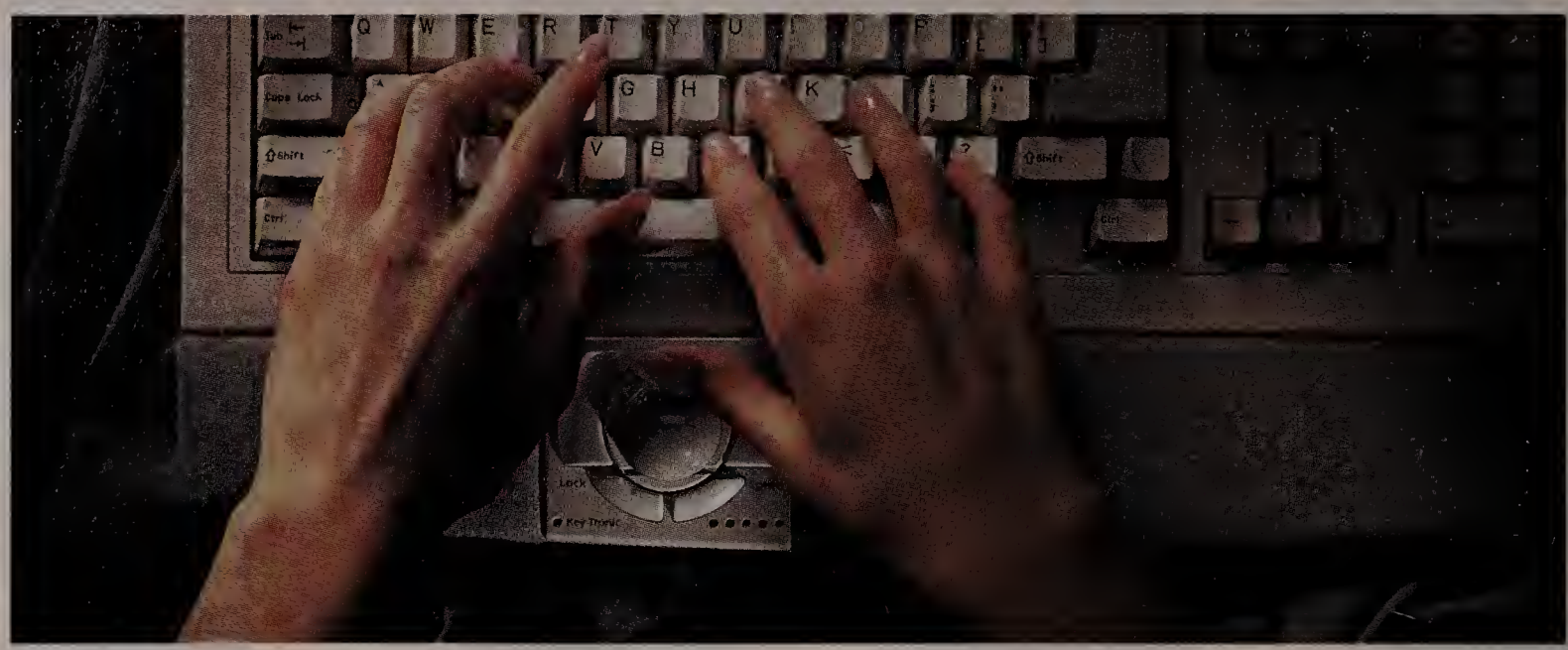
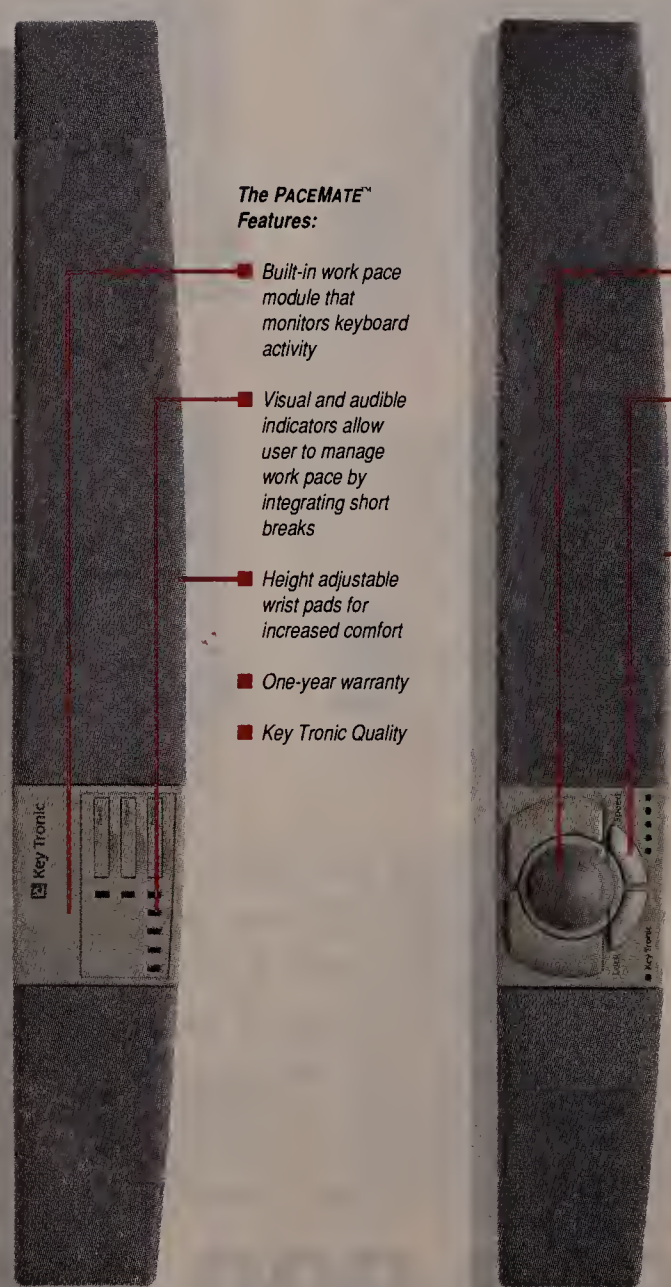
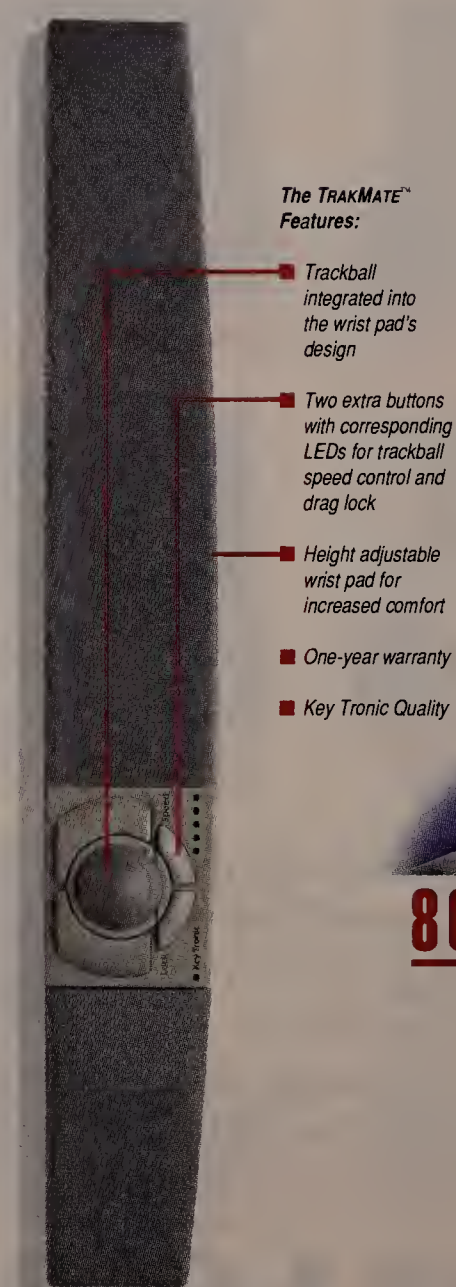


Wrist Management.



The PACEMATE™ Features:

- *Built-in work pace module that monitors keyboard activity*
- *Visual and audible indicators allow user to manage work pace by integrating short breaks*
- *Height adjustable wrist pads for increased comfort*
- *One-year warranty*
- *Key Tronic Quality*



The TRAKMATE™ Features:

- *Trackball integrated into the wrist pad's design*
- *Two extra buttons with corresponding LEDs for trackball speed control and drag lock*
- *Height adjustable wrist pad for increased comfort*
- *One-year warranty*
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Product Category	Business Class	Computer Showplace
HARDWARE		
Bios Chip		271
Communications	268	
Computer/Systems	268	271
Peripherals	268	271
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SOFTWARE		
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Disk Copy Service		273
Disks		272
Furniture	269	
On-Line Services	270	
Supplies		273
Shipping Cases	270	

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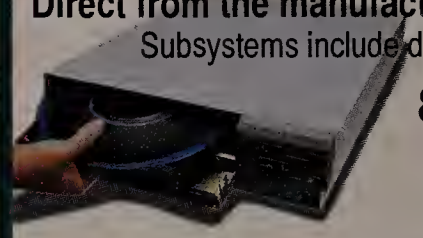

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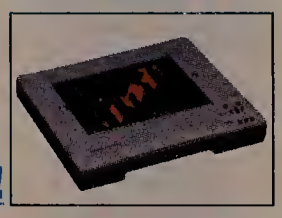

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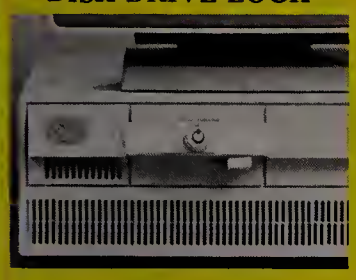

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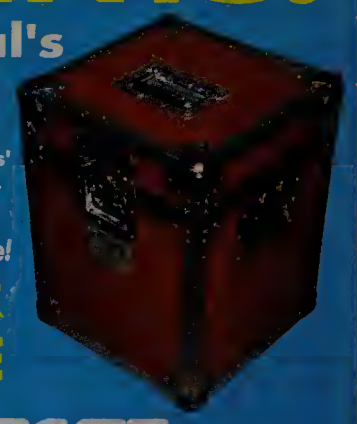

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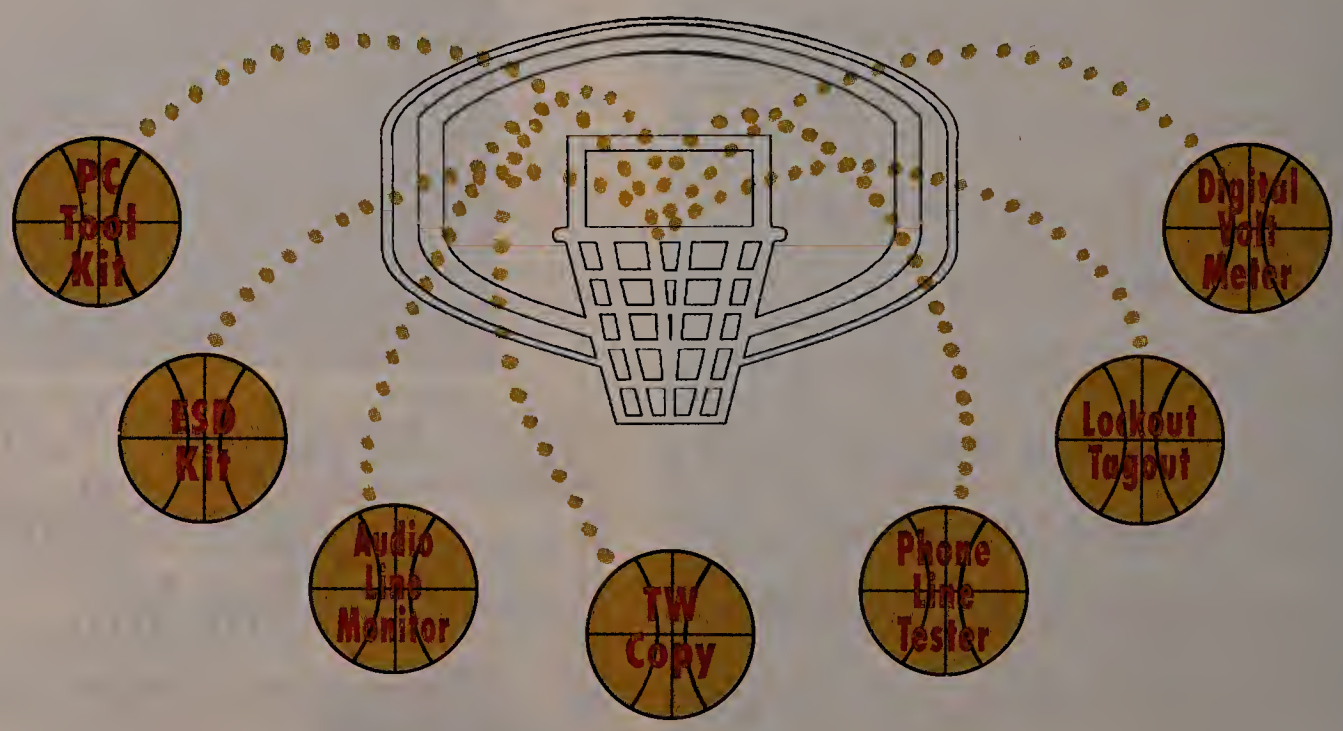

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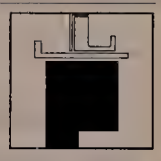

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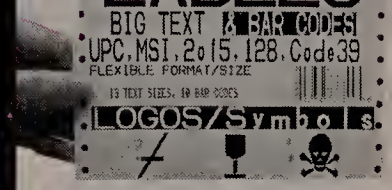

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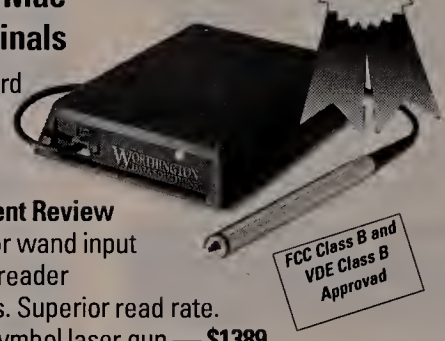

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FORMATTED DISKETTES BASF, VERBATIM, SONY

WITH FORMAT	QTY 250 MIX & MATCH	WITHOUT FORMAT
$.38	5.25" DS/DD	**$.33**
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$.59	3.50" DS/DD	**$.49**
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- **FREE FORMATTING** on First Order
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- **MONEY BACK GUARANTEE**

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CIRCLE 448 ON READER SERVICE CARD

PC WORLD *delivers the buyers you need to reach!*

Study after study has proven that managers proficient with PCs now control the business PC buying process. Make sure your advertising gets maximum exposure in your best target market.

DATA/DISK CONVERSION

CONVERTING YOUR DISKETTES?

ENTRUST THEM TO US
2500 Word Processor & Computer formats 3½", 5¼", 8" DISKS, 3480, 8mm, TK50, CARTRIDGES, MAGTAPES, MAGCARDS, CASSETTES,

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Customized conversions too! Call us for quality, best prices and quickest turnaround time

COMPANY COMPENDIA, INC.
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or (312) 419-8771 FAX: (312) 419-1390

CIRCLE 490 ON READER SERVICE CARD

FACT: *Each PC WORLD subscriber influenced software purchases of $19,587 in 1991 alone.*

DATA/DISK CONVERSION Cont.

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Capabilities include over 4000 formats

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(800) 860-1033

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- Custom Programming
- Data Management
- Bar Code Conversion
- CD ROM Development

Free Tests and Quotations
24 Hour Turn-Time

Media Conversion
will scan any font or typestyle, convert any disk or tape and make duplicates any size or quantity

MEDIA CONVERSION CORP
Chicago and Glen Ellyn Locations

CIRCLE 515 ON READER SERVICE CARD

SUPPLIES

TONER! New & Remanufactured toner cartridges & other supplies for laser printers!

RIBBONS! New and Reloaded ribbon cartridges for impact printers!

ink jet refills!

- RECYCLE & SAVE up to 70% on printer supplies!
- Friendly service & great products for over 20 years.

CALL FOR FREE SUPPLIES CATALOG

800-426-8196
We buy empty toner cartridges.

WILLOW

CIRCLE 492 ON READER SERVICE CARD

DISK COPY SERVICE

DUPLICATION FROM $.49 HIGHEST QUALITY MEDIA

MSDOS duplication from **$.49** (5.25") and **$.80** (3.5"). Prices go even lower as you continue to order!

- Duplication + 100% Verification
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- Custom Packaging & Assembly
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- Educational Discounts Available
- 24 Hour Turn-Around
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CIRCLE 422 ON READER SERVICE CARD

Software Production

- Full packaging services
- Duplication, all formats
- EVERLOCK copy protection
- Label and sleeve printing
- 48 hour turn around
- Fulfillment and drop shipment
- Consultation and guidance

Star-Byte, Inc.
2880 Bergey Rd., Hatfield, PA 19440

800-243-1515

CIRCLE 477 ON READER SERVICE CARD

TONER

LASER QuipT®
10300 Bren Road East
Minnetonka, MN 55343

Remanufactured cartridges for HP, Apple, etc. Exchange Price

$36.50

VISA **800-777-8444** MC, COD

CIRCLE 429 ON READER SERVICE CARD

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Software

ACCOUNTING

FACT: 23% *of PC WORLD's subscribers purchased PC* ***software*** *from mail-order companies last year.*

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913/381-9118

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If you do, the Aristo Parcel Shipping System (APSS™) is for you! Meets all UPS requirements. Prints COD & regular labels, Pickup Manifest, etc. Saves customer lists. Calculates zones & charges. Flexible setup menu to suit your needs. On-line help. Optional scale interface & other carriers. (RPS, Airborne,Fed Ex, USPS, LTLs, etc). 60 Day $ back Gtd. UPS acceptance gtd. Full featured demo disk: $4 s/h.
Aristo Computers, Inc.
6700 SW 105th Ave. #307-J
Beaverton, OR 97005
800/3ARISTO, 503/626-6333

UPS Shipping Software

Direct interface to Macola, DacEasy, RealWorld, Great Plains and Platinum. Used as TSR can work with almost any software. Also works great stand-alone. Computes zone & charges. Prints Manifests, COD tags, shipping labels, etc. Optional 100WT, GSV, RPS, USPS, FedEx, scale intf. Only $249, network $449. Gtd UPS acceptance. 60-Day money back. Free trial offer.
V-Technologies
P.O. Box 6261
Wolcott, CT 06716
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Fax (203) 879-6962

Get The Facts!

Improve the visibility of your ad. Add second color and receive an average 41% higher response rate on your ad. Call your PC WORLD account rep for details.

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Written by Computer professionals involved in church management. Skilled users love its power, depth and flexibility. Novices love its ease of use. 13 optional modules with support and upgrade. For IBM compatible and LANs. Object oriented graphic user interface, pop-up menus, windows mouse compatibility and more.

Software by Summit Systems Inc.
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Fax: 803/731-0349

Church Management Systems

Expect the best!

- *Outstanding Reporting*
- *Superior Support*
- *Integrated Modules*
- *Over 1500 Users*
- *Free Preview Disk*

1-800-247-8044

TSL - 3300 Bass Lake Road, -#304
Brooklyn Center, MN 55429
FAX 612-566-2250

CIRCLE 415 ON READER SERVICE CARD

CHURCH SOFTWARE

Discover for yourself why more churches are choosing **PowerChurch Plus.®**
Try out the leading membership and accounting package.
Call today for your **FREE** full-working **DEMO**.

F1 SOFTWARE, 208 Ridgefield Drive, Asheville, NC 28806
800/486-1800

CIRCLE 482 ON READER SERVICE CARD

DATA ENTRY

Viking Data Entry

Professional Quality Software
- Used by U. S. Census
- Advanced Validation
- Sequential/ISAM files
- MS/DOS, UNIX, XENIX, VMS, AIX
- Technical Support
- Re-key verify

Viking Software Services
4808 E. 67th St. Ste. 100
Tulsa, OK 74136
918/491-6144 FAX: 918/494-2701
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Replace dedicated *data input* systems
Front-end mainframe applications

KeyEntry III®

- ❑ LAN or stand-alone environments
- ❑ ScreenPainter and MenuManager included
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- ❑ Spanish, German, and French versions
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FAX: 702-831-8123

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The *Top-Rated* Nutrition-Fitness Software. Over 700,00 users. Lose weight! Control salt, fat, cholesterol! Plan fitness workouts. Fast, easy menu & diet planning. Analyze foods, recipes, menus, food exchanges. Professional & personal use. 2000 to 15,500 foods; 100 to 240 activities. $79 - $995. ***FREE Demo Disk!***

You'll ❤ it! Call now

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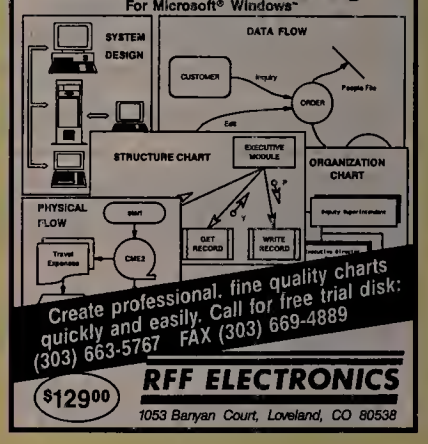
ESHA Research • Box 13026-B
Salem, OR 97309 • Fax: 503-585-5543

CIRCLE 408 ON READER SERVICE CARD

FLOW CHARTING

RFFlow
Professional Flowcharting
For Microsoft® Windows™



Create professional, fine quality charts quickly and easily. Call for free trial disk: (303) 663-5767 FAX (303) 669-4889

$129.00

RFF ELECTRONICS
1053 Banyan Court, Loveland, CO 80538

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Need Inventory Control??
Tired of doing things the hard way?
The POS has invoicing, reorder reports, on line stock search and browse, inventory updating, purchase orders
Supports cash drawer, tape receipt printer, pen & laser barcode scanners
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Freeman Software Garland, Texas
800-426-6598 334 Fieldside Dr. 214-270-0625

Retail Point of Sale
****
Inventory Programs for Mail order Wholesalers Auto Parts Tire Dealer Package stores Office supply

CIRCLE 518 ON READER SERVICE CARD

Advertising Age Reports: PC WORLD's *ad sales jumped 23.3% during last year's "recession".*

Why? Because products sell when advertising in these pages. Every issue, every day, in good years and bad, PC WORLD *works.*

Contact Catalog sales today: 800/262-9885

MAIL ORDER

Mail Order Manager (M.O.M.)™

America's most popular, complete, and affordable solution for the mail order business - order entry/review, credit card processing with draft capture, UPS manifesting, profit analysis, accounting, telemarketing, list management. Clipper compiled, dBase III + files. Single and Multi-user versions. Find out why more people buy MOM after comparing! Call for demo kit.
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Montville, NJ 07045
(800)858-DMOM (201) 335-1256

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Complete management system for a catalog, inbound telemarketing, or mail order company. Order processing, inventory mgt, ad forecasting, sales/banking, list mgt, modem charge approval, EDC, UPS manifest w/scale interface. Single and Multi User Systems. Inbound/Outbound Editor's choice.
Haven Corporation
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Evanston, IL 60202
800/782-8278, 708/869-3434

MUSIC

CIRCLE 514 ON READER SERVICE CARD

SongWright V

MUSIC PROCESSOR prints professional sheet music, songs, scores with text, chords, dynamics. Compose, edit, record, play, transcribe, copy, transpose, extract import, publish - all in standard notation. Symbol editor/librarian. PC, MIDI/AdLib, or SMF entry & playback. Matrix/laser/Deskjet printers. $119.95+$5 s/h. Free sample output.
SONGWRIGHT SOFTWARE
7 Loudoun Street, S.E. Ste 5B
Leesburg, VA 22075
1-800-877-8070, 703-777-7232j2

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Maintenance & Inspection

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San Jose, CA 95160
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CLAIM NET- Nationwide elctrnc claims clearinghse transmits to 100+ ins. carriers. SW starts at $649. Dealer inquiries welcome
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Indianapolis, IN 46204
800/428-3515, 317/634-8080

PUBLIC DOMAIN/ SHAREWARE

CIRCLE 427 ON READER SERVICE CARD

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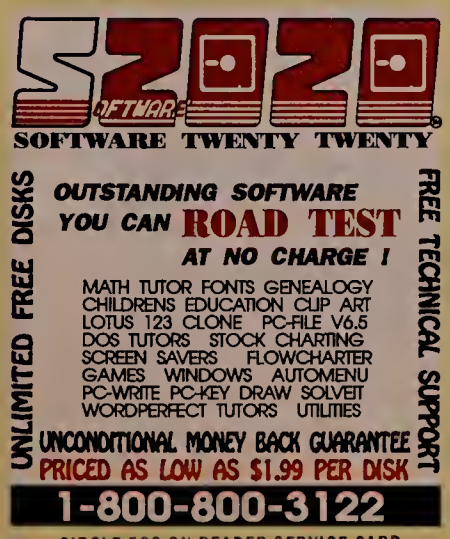
POINT-OF-SALE SOFTWARE. Improves Profits & Communications; Quick to Install & Learn. Runs on any compatible PC or Motorola 8120 RISC UNIX server. Reseller inquiries welcomed. $495/base copy $295/ea. addt'l NW copy; 30-day Money Back Guarantee. Working Demo Disk available $20.
ADVANTA Technologies
One West Loop South, Suite 801
Houston, TX 77027
(800) 324-2388

CIRCLE 402 ON READER SERVICE CARD



CIRCLE 500 ON READER SERVICE CARD

Advertising Age Reports:

PC WORLD's *ad sales jumped 23.3% during last year's "recession".*

Why? Because products sell when advertising in these pages. Every issue, every day, in good years and bad, PC WORLD works.

Contact Catalog sales today: 800/262-9885

PC WORLD DELIVERS THE BUYERS YOU NEED TO REACH

Study after study has proven that managers proficient with PCs now control the business PC buying process. Make sure your advertising gets maximum exposure in your best target market.

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New version which looks up tenants & posts rent by Tenant Name Prints. Bank Deposit Slips, Rent Statements, & Automatic Checks. Reports. Late Rents, Vacancies & Expired Leases. Posts Management Fees, Pays Owners & does 1099s. Saves up to 80% of accounting time & is the EASIEST system to use! Multi-User version available.
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Property Management

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Mt. Pleasant, UT 84647
800/942-6784 or 801/462-2130

Property Management

Comprehensive software for managing residential, commercial, condos & more. Three versions: Basic PM for owner/manager-$495, Deluxe PM for professional management-$1,195, Multi-User with Novell network compatibility-$2,395. Includes check writing, recurring expenses, G/L, management reporting.
Yardi Systems, Inc.
819 Reddick Street
Santa Barbara, CA 93103
805/966-3666

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School Partner

FACT: THIS SYSTEM COSTS A FRACTION OF LESSER SYSTEMS, and DOES MORE!
OUR SYSTEM CAPABILITIES INCLUDE:
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Az-Tech Software, Inc.
201 East Franklin
Richmond, MO 64085
(816) 776-2700 FAX (816) 776-8398

FACT:
Add RED as a second color. Increase response by 41%.

Electronic Privacy

PCCrypto™ enciphers any DOS file for absolute privacy by using the One Time Pad algorithm – the only unbreakable cryptosystem. Menu driven, on-line context sensitive help. Sold in sets of two. 30 day money back guar. Send $59 check/MO per set + $2 S&H (+$2.66 tax in VA). Or write for more info!
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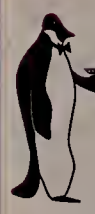
Petaluma, CA 94952
Ph (707)765-1001 Fax (707)765-1068

UTILITIES

ICSMENU

The menu for users without Windows



Runs any program or series of up to four DOS commands with a single keystroke. Chain as many menus as desired. Never fumble again trying to remember a directory name or command. Low system overhead. $50.
To order call (203) 657-3339.
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VISA MasterCard
IMAGINE THAT
One Evergreen, Seaville, NJ 08230

CIRCLE 486 ON READER SERVICE CARD

What's Up at PC WORLD?

Circulation

√ Rate Base 901,000 – an increase of 281,000

√ Newsstand up 28%

Reader Response

√ Over 1,000,000 Reader responses to ads in PC WORLD last year.

Editorial Pages

√ More editorial pages covering more products for managers.

√ Focused on manager's needs: how to plan, buy and use.

Advertising Pages

√ Up 12% year-to-date.

√ More advertisers are investing more ad pages in PC WORLD than ever before.

More Managers Than Ever

√ 74% of subscribers are managers proficient with PCs.

√ 646,000 unduplicated management readers.

FREE PRODUCT INFORMATION PC WORLD

NAME

TITLE

COMPANY

ADDRESS

CITY STATE ZIP

PHONE ( ) FAX ( )

INFORMATION FROM ADVERTISERS

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
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Circle the number corresponding to the product or product category you need to know more about. Mail or fax the completed card today. Manufacturers will send product information directly to you. Fax to (413) 637-4343.

PRODUCTS FEATURED IN EDITORIAL

601	602	603	604	605	606	607	608	609	610	611	612	613	614	615	616	617	618	619	620
621	622	623	624	625	626	627	628	629	630	631	632	633	634	635	636	637	638	639	640
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PRODUCT CATEGORY INFORMATION

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954 Monitors and video boards
955 Accounting software
956 Draw/paint software
957 Network/sharing products
958 Printers
959 Multimedia products
960 Utilities
961 Mail order companies
962 Storage devices

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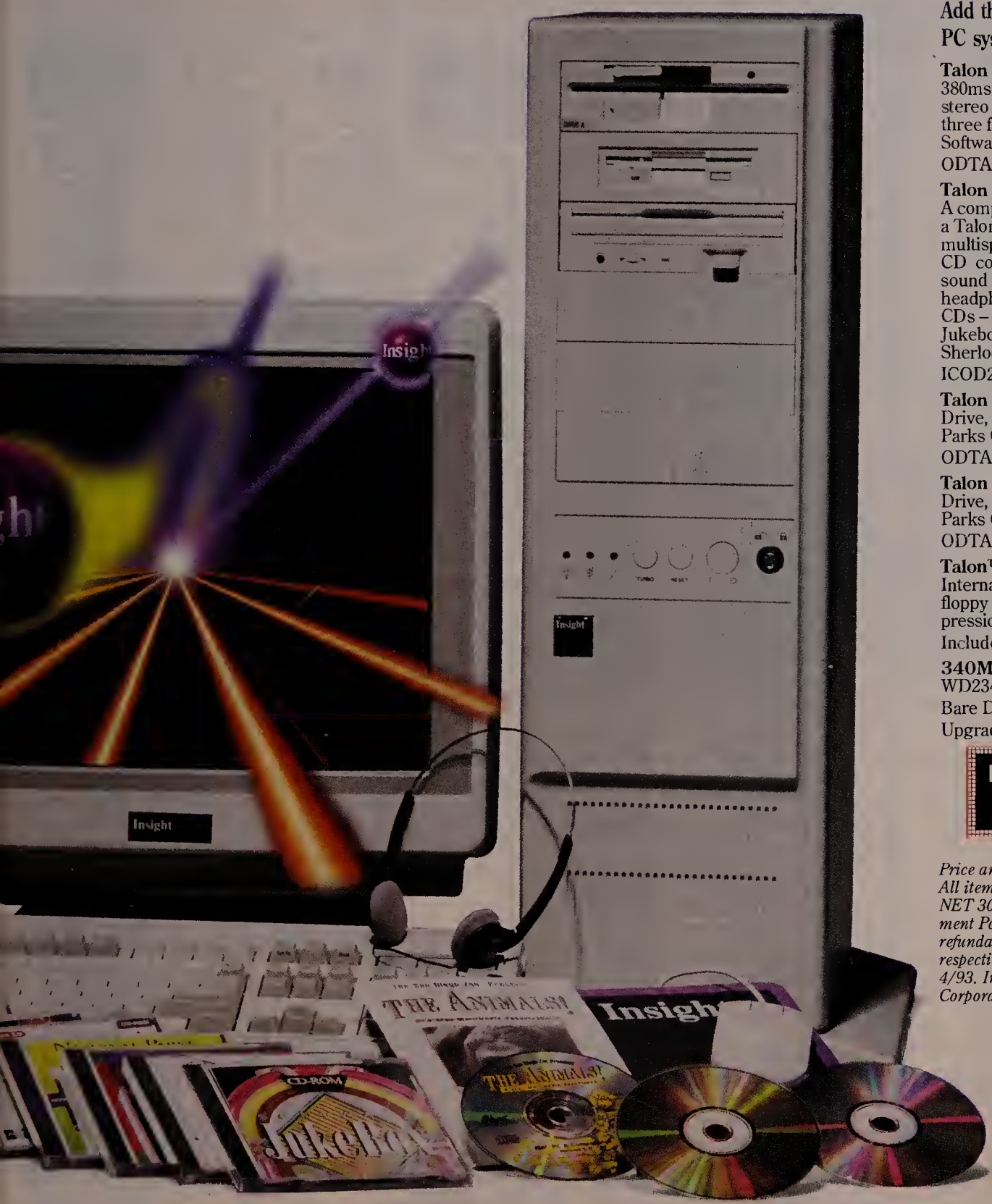

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OVERDRIVE SX/DX33	749.00	3167-25MHZ WEITEK	395.00		
OVERDRIVE SX/DX25	599.00	3167-33MHZ WEITEK	495.00		
OVERDRIVE SX/DX20	499.00	4167-25MHZ WEITEK	445.00		
RAPID CAD	289.00	4167-33MHZ WEITEK	695.00		

SIMM-SIPP MODULES

	EACH 12+			EACH 12+			EACH 12+	
4MB X 9-80NS SIMM-PC	CALL	CALL	256K X 9-100NS SIMM	CALL	CALL	1MB X 9-70NS SIPP	CALL	CALL
4MB X 9-70NS SIMM	CALL	CALL	256K X 9-80NS SIMM	CALL	CALL	1MB X 9-60NS SIPP	CALL	CALL
4MB X 9-60NS SIMM	CALL	CALL	256K X 9-70NS SIMM	CALL	CALL	256K X 9-100NS SIPP	CALL	CALL
1MB X 9-100NS 3 CHIP SIMM	CALL	CALL	256K X 9-60NS SIMM	CALL	CALL	256K X 9-80NS SIPP	CALL	CALL
1MB X 9-80NS 3 CHIP SIMM	CALL	CALL	1MB X 8-80NS SIMM	CALL	CALL	256K X 9-70NS SIPP	CALL	CALL
1MB X 9-80NS 9 CHIP SIMM	CALL	CALL	1MB X 8-70NS SIMM	CALL	CALL	256K X 9-60NS SIPP	CALL	CALL
1MB X 9-70NS 3 CHIP SIMM	CALL	CALL	4MB X 8-80NS SIMM	CALL	CALL	256 X 36 – 1MB	CALL	CALL
1MB X 9-70NS 9 CHIP SIMM	CALL	CALL	4MB X 8-70NS SIMM	CALL	CALL	512 X 36 – 2MB	CALL	CALL
1MB X 9-60NS 3 CHIP SIMM	CALL	CALL	1MB X 9-100NS SIPP	CALL	CALL	1 X 36 – 4MB	CALL	CALL
1MB X 9-60NS 9 CHIP SIMM	CALL	CALL	1MB X 9-80NS SIPP	CALL	CALL	2 X 36 – 8MB	CALL	CALL
1MB X 9-63NS 3 CHIP SIMM	CALL	CALL				4 X 36 – 16MB	CALL	CALL
1MB X 9-53NS 9 CHIP SIMM	CALL	CALL						
16MB X 9-70NS SIMM	CALL	CALL						

Quantum
FUJITSU
Maxtor
Seagate
MICROPOLIS
CONNER
WESTERN DIGITAL

Apple

POWERBOOK 100, 140, 145, 170
2MB MOD M1032LL-A $ 99
4MB MOD M1033LL-A 199
6MB MDD N/A 264
POWERBOOK 160, 180
2MB MDD N/A 130
4MB MDD N/A 290
6MB MDD N/A 295
8MN MOD N/A 380
10MB MOD N/A 460
POWERBOOK 210, 230
NOTE: THERE ARE THREE TYPES OF MODULES FOR MODELS 210 & 230, "UPGRADABLE", "BASE" AND "CONVENTIONAL". BE SURE TO PURCHASE THE CORRECT ONE FOR YOUR NEEDS.
CONVENTIONAL (STANDARD)
2MB MDD N/A 175
4MB MDD N/A 290
6MB MDD N/A 400
8MB MDD N/A 500
10MB MDD N/A 685
12MB MDD N/A 795
BASE - WILL ACCEPT 1 UPGRADE MODULE
4MB MDD N/A 380
8MB MDD N/A 500
12MB MDD N/A 685
20MB MDD N/A 2500
UPGRADE MODULES - INSTALL ON THE BASE MODULES
4MB MDD N/A 295
6MB MDD N/A 505
16MB MDD N/A 2300
MAC PORTABLE
2MB MDD N/A 339
3MB MDD N/A 579
4MB MDD N/A 662
MAC PORTABLE BACKLIT
2MB MDD N/A 232
3M3 MDD N/A 319
4MB MDD N/A 335
IIGS
1-4MB E-C N/A 149
MAC PLUS
2MB KIT M0219 68
4MB KIT M0207 136
MAC CLASSIC
1-3MB E-C M6361LL-A 66
2MB KIT M0219 68
MAC CLASSIC II, LC, LCII
2MB KIT M0219 68
4MB KIT N/A 138
8MB KIT N/A 250
MAC SE
2MB KIT M0219 68
4MB KIT M0207 138
MAC SE/30
4MB KIT M0207 138
16MB KIT N/A 610
MAC II
4MB KIT M0207 138
MAC IIX
4MN KIT M0207 138
16MB KIT N/A 575
MAC LC
2MB KIT M0219 68
4MB KIT N/A 120
8MB KIT N/A 230
512K VRAM 47
MAC IISI, IICI
2MB MOD M0514LL-A 69
16MB KIT N/A 575
32MB KIT N/A 1050
64MB KIT N/A 1995
MAC IIFX
4MB KIT M0376LL-A 143
16MB KIT N/A 575
64MB KIT N/A 1995
MAC IICX
4MB KIT M0207 138
16MB KIT N/A 575
32MB KIT N/A 1050

MAC QUADRA 700, 900, 950
4MB KIT M0207 138
16MB KIT N/A 575
32MB KIT N/A 1050
64MB KIT N/A 1995
QUADRA VIDEO 700,950
512K KIT M5951LLA 68
QUADRA VIDEO 950
512K KIT M593LLA 70
PERSONAL LASER WRITER LS
512K KIT 3340114 35
PERSONAL LASER WRITER NT
2MB KIT M0219 68
8MB KIT N/A 269
LASERWRITER IINTX, IINTXJ
1MB KIT M0005 67
4MB KIT M5006 143
LASERWRITER IIF/IIG
4MB KIT M0207 138
16MB KIT N/A 575
LASER WRITER IINTR
2MB 110
MAC IIVX
4MB KIT M0292LLA 138
16MB KIT N/A 575
32MB KIT N/A 1050
64MB KIT N/A 1995
MAXIMA MEMORY MGR $50

AST

AST PREMIUM EXEC. 286/12, 386SX/20
1MB MOD 500814001 $ 69
4MB MOD 500814003 140
AST PREMIUM EXEC. 386SX/25, 25C, 25SL, 25SLC
4MB MOD 500814004 140
BRAVO 286
2MB KIT 500510002 75
4MB KIT 510008 170
BRAVO 486/25, 4-25
2MB KIT 500718004 86
8MB KIT 500780001 282
BRAVO 3-25S
2MBN KIT 500710004 95
8MB KIT 500824002 290
BRAVO 3-33LC
2MB KIT 500992001 90
8MB KIT 500992002 290
BRAVO 386SX
2MB KIT 500510002 85
4MB KIT 500510008 170
BRAVO 386SX20
2MB KIT 500710003 85
8MB KIT 500824001 270
BRAVO 425S, 433LC, 450N, 486D
2MB KIT 500987001 100
4MB MOD 500987002 150
8MB KIT 500987003 299
16MB MOD 500987004 525
32MB KIT 500987005 1250
PREMIUM 386/25, /33, 386SX/20, 486/33, 486SX/20, PREMIUM 386SX/16, 486/33TE
1MB MOD 500780003 43
2MB KIT 500780005 86
4MB MOD 500780004 138
8MB KIT 500780001 312
0-32MB E-C 500618001 279
OFFICE ADVANTAGE
386SX/20, 486SX/20
2MB KIT 500861001 88
8MB KIT 500891002 299
PREMIUM 386
4MB 500510004 214
POWER PREMIUM 3/33, 4/33 & 4/50
2MB KIT 500780005 88
8MB KIT 500780001 312
PREMIUM WKST 286, 386SX
2MB KIT 500510002 76
4MB KIT 500510008 178
PREMIUM 386/16,C
4MB KIT 500510008 170
PREMIUM SE 4/33
2MB KIT 500780005 86
8MB KIT 500780001 312
PREMIUM SE 4/50
16MB KIT 500928001 690
32MB KIT 500928002 1390

ALR

ALR POWERFLEX
ALR FLEX CACHE 386SX
2MB KIT 12902000 $ 80
4MB KIT 12904000 156
ALR BUSINESS VEISA
ALR BUSINESS VESA ARRAY
ALR MPS
1MB KIT 12901000 49
4MB KIT 12904000 156
16MB KIT 12916000 625
0-32MB E-C 12407480 182
ALR BUSINESS STATION
ALR POWER PRO
ALR POWER PRO ARRAY
ALR POWER PRO/MC
ALR POWER FLEX FLYER, 20CX
1MB KIT 12901000 49
4MB KIT 12904000 156
16MB KIT 12916000 625
ALR POWER CACHE 486-486E
ALR MICROFLEX 3000
2MB KIT 12902000 80
4MB KIT 12904000 166
16MB KIT N/A 625
32MB KIT N/A 1250
ALR FLYER 32LCT, 32DT, 3D32
1MB 32LCT ONLY 53
4MB 12901804 155
16MB 12904818 695
RANGER SERIES
4MB MOD 12928010 340
8MB MOD 12928016 649
16MB MOD N/A 1949
VENTURA NOTEBOOK 18 & 26
4MB MOD 12407970 990

AT&T

SAFARI MSX/20
2MB C-C 37650 $ 189
4MB C-C 37651 340
6286WSG
2MB KIT 37727 175
6386, 6738SEWGS
4MB KIT 37716 285
6386/SX
2MB KIT 37336 78
0-8MB E-C N/A 129
6386/25, 33WGS
2MB KIT 37261 70
STAR SERVER 486/33E
4MB KIT 37261 285
16MB KIT 37283 965
STAR SERVER 486/33S
4MB KIT 37344 235
16MB KIT 37345 885

EPSON

HB-3L/20, /25, /25C
2MB MOD A808771 $ 128
4MB MOD A808781 199
8MB MOD N/A 1200
NB3S
4MB MOD A808511 190
EQUITY LT-286
1MB MOD A808191 123
EQUITY LT-386SX
2MB MOD A806361 235
EQUITY 286 PLUS
2MB MOD A808101 80
EQUITY 386SX/16 PLUS
1MB KIT A808231 52
2MB KIT A808101 80
EQUITY 386/25 PLUS, 386SX PLUS
2MB KIT A808101 80
EQUITY 386SX/20 PLUS
8MB KIT A808631 399
EQUITY 486SX/25 PLUS
2MB KIT A808101 80
486/33, EISA & TOWERS
2MB KIT A808591 120
8MB KIT A808711 340
16MB KIT A808673 620
EPL 6000 L-P
2-4MB E-C IBS401 104
4MB E-C N/A 185
EPL 7000 L-P
2-4MB E-C C822011 225
4MB E-C C822061 349
EPL 7500 L-P
2-4MB E-C C822051 225
4MB E-C C822021 349
ACTION LASER II
1MB E-C 80
2MB E-C 125
3MB E-C 165
5MB E-C 210

COMPAQ

LTE 8088 PROCESSOR
512K MOD 117077001 $ 107
LTE 286
1MB KIT 117081001 65
2MB KIT 117081002 89
4MB KIT 117081003 175
LTE 386S/20
1MB C-C 121125001 65
4MB C-C 121125002 192
LTE LITE 20, 25
2MB C-C 127679001 120
4MB C-C 127679002 199
8MB C-C 127679003 360
16MB C-C N/A 1295
SLT/286
1MB MOD 110235001 89
4MB MOD 110237001 210
SLT 386/20
4MB MOD 118305001 169
PORTABLE III
512K KIT 107331001 40
2MB KIT 107332001 80
INTERFACE 107808001 110
EXP BOARD 107811001 250
PORTABLE 386
1MB KIT 107651001 110
INTERFACE 107707001 125
4MB E-C 107653001 349
4MB ADM 107654001 349
PORTABLE 486C
2MB MOD 118689001 78
4MB MOD 118690001 149
8MB MOD 128877001 299
DESKPRO 286
2MB KIT N/A 79
0-16MB E-C N/A 129
DESKPRO 286E
2MB KIT N/A 79
0-16MB E-C N/A 129
DESKPRO 386-16
1MB KIT 108071001 129
2MB E-C 108059001 209
2MN E-C 108069-71-001 348
4MB E-C 108070001 468
8MB E-C 108070-72-001 696
DESKPRO 386S
2MB E-C 113533001 160
4MB E-C 113534001 229
1MB MOD 113646001 75
4MB MOD 112534001 172
DESKPRO 386/25, /25F
1MB E-C 113644001 106
4MB E-C 113645001 236
1MB MOD 113131001 75
4MB MOD 113132001 172
DESKPRO 386/33
2MB MOD 115144001 120
DESKPRO 386/33L, 486/33L
2MB MOD 115144001 120
8MB MOD 116561001 349
32MB MOD 116568001 1395
6 SOCK-EC 116569001 199
DESKPRO 486/25, /50L
2MB MOD 115144001 120
8MB MOD 116561001 349
32MB MOD 116568001 1395

DESKPRO 386/25M, 486/33M, 486/33M, /25M
1MB MOD 118688001 49
2MB MOD 118689001 78
4MB MOD 118690001 149
8MB MOD 128877001 299
8 SOCK-EC 129160001 291
DESKPRO 386N, 386N, 386S/20N
1MB MOD 118688001 49
2MB MOD 118689001 78
4MB MOD 118690001 149
8MB MOD 128877001 299
3 SOCK-EC 119700001 80
PROLINEA 3/25S, 3/25ZS
2MB KIT 141736-001 80
8MB KIT 141742-001 295
PROLINEA 4/33, 4/50
1MB MOD 141682-001 45
2MB MOD 141683-001 86
4MB MOD 141684-001 149
8MB MOD 141685-001 299
SYSTEMPRO
2MB MOD 115144001 94
8MB MOD 116561001 288
32MB MOD 116568001 1535
6 SOCK-EC 116569001 189
SYSTEMPRO/LT 386-25S, 486SX-25S
1MB MOD 118688001 49
2MB MOD 118689001 78
4MB MOD 118690001 149
8MB MOD 128877001 299
8 SOCK-EC 129160001 291
CONTURA 320, 25
2MB MOD 139497001 68
4MB MOD 139498001 168
8MB MOD 139499001 318
DESKPRO M-SERIES
SYSTEMPRO LT 486SX/25S & 325/25SE
2-64MB BD 129160 + 689 349
4-64MB BD 129160 + 690 449
8-64MB BD 129160 + 877 579
SYSTEMPRO/XL
16MB KIT 136616001 640
32NB KIT 136817001 1280
128MB KIT 139918001 CALL
8 SOCK-EC 139938001 $CALL
PRODIGMIA
1MB MOD 118688001 49
2MB MOD 118689001 78
4MB MOD 118690001 149
8MB MOD 128877001 299
16MB MOD 139817001 690
32MB MOD 149147001 1350
LITE 4/25C
2MB CRD 142337002 120
4MB CRD 142337003 199
8MB CRD 142337004 360

DELL

320M, 212N, 320NPLUS
1MB MOD 3133203 $ 90
2MB MOD 3133204 139
NL20, NL25
2MB MOD 3133213 149
325P, 325D, 333D, 333P, 320SX, 433P, 486D, 485P
1MB MOD 3102505 60
4MB MOD 3102507 175
450D, 466P
16MB MOD 3102625 580
420, 425, 433, 466
450DE, 450SE, 450TE
2MB KIT 3102466 115
4MB KIT 3102467 175
8MB KIT 3102468 345
TE & SE ONLY
16MB KIT 3102469 580
32MB KIT 3102630 1399
NOTEBOOK 325NL, 325N
2MB 130
433E & 425E
2MB KIT 3102389 115
4MB KIT 3102390 175
8MB KIT N/A 345
316SX
2MB KIT 3102349 95

hp

HP VECTRA 286/12, ES12PC
2MB KIT D1354A 78
0-16MB E-C 120
386/16N, /20N
2MB KIT D2406A 79
8MB KIT D2404A 295
QS/16S, RS25PC, 20PC, 20C
2MB KIT D1354A 84
386/25PC, 486UPC
2MB MOD D2381A 84
8MB MOD D2152A 299
486/20PC, 486PC, 486ZST, 486ST
1MB MOD D2150A 47
2MB MOD D2381A 84
4MB MOD D2156A 155
8MB MOD D2152A 299
9000/375, /380, 345, 400DL, 400S, 400T, 425S
8MB KIT H9822B 450
16MB KIT H9822B 852
32MB KIT H9822B 1450
9000/425T
4MB KIT H9822B 275
8MB KIT H9822B 450
16MB KIT H9822B 850
9000/433S
8MB KIT H9822B 450
9000/425E
4MB KIT A2200A 275
8MB KIT A2201A 450
16MB KIT A2202A 850
9000/720, /730
16MB KIT A1979A 875
32MB KIT A2512A 1925

9000/750
16MB KIT A1979A 875
32MB KIT A1987A 1595
9000/755, /710
8MB KIT A2216A 395
16MB KIT A2217A 750
32MB KIT A2218A 1395
X-STATION 700SX
1MB MOD C2320A 53
2MBN MOB C2321A 90
4MB MOD C2322A 163
8MB MOD D2152A 299
DESKJET 500C, 500 PLUS
256KB MOD H2270B 64
LASERJET II, ND
2-4 E-C H3344B 102
4MB E-C H3344B 169
LASERJET IIP, III,
IIID, IIIP
2-4MB E-C H3347B 89
3-4MB E-C H3347B 125
4MB E-C H3347B 159
LASERJET IIISI
4MB MOD C2065A 140
IIP-4
4MB MOD N/A 149
8MB MOD N/A 299

EVEREX

TEMPO LX, LX20
2MB MOD N/A $ 90
TEMPO CARRIER
2MB MOD N/A 115
TEMPO 286
2MB KIT N/A 85
TEMPO 386SX
2MB KIT N/A 85
4MB KIT N/A 170
STEP SERIES 286-12, -16, -20, 386-16 & 20
2MB KIT N/A 85
4MB KIT N/A 170
STEP SYSTEMS 386S, 386SX/20
4MB KIT N/A 170
8MB KIT N/A 312
16MB KIT N/A 625
386/25, /33, SERVER 386
486/33, 486SX/20, 486EISA, SERVER 486
4MB KIT N/A 170
16MB KIT N/A 625

ZENITH

MASTERSPORT 286
1MB MOD ZA2121 $ 110
MASTERSPORT 386SX
2MB MOD ZA3001 191
MASTERSPORT 386SL, 386SLE
2MB MOD ZA44 99
SLIMSPORT
1MB MOD ZA18095 133
2MB MOD ZA18064 199
4MB MOD ZA18071 365
TURBOSPORT 386
1MB MOD ZA30344ME 133
TURBOSPORT 386E
1MB MOD ZA3034ME 45
4MB MOD ZA3035ME 222
SUPERSPORT 286
1MB MOD 18066 95
SUPERSPORT 286E
1MB MOD ZA18066 95
2MB MOD ZA18064 168
4MB MOD ZA18071 399
SUPERSPORT SX
2MB MOD ZA18064 168
2MB MOD
ZA18066 ALPHA 105
2MB MOD
ZA16087 BETA 108
Z-286LP PLUS
2MB KIT Z6051 95
0-16MB E-C N/A 129
Z-386SX, Z-386SX/20
2MB KIT Z6051 95
0-16MB E-C N/A 129
Z-386/20, /25, /33, /33S
1MB MOD Z3600ME 42
4MB MOD Z3800MK 126
Z-486/33ET
4MB KIT ZA4200M2 166
16MB KIT ZA4200M8 535

SUN

SPARCSTATION ELC
4MB MOD X104D $ 173
16MB MOD X116D 550
SPARCSTATION IPC
4MB KIT X104Y 154
16MB KIT X116Y 550
SPARCSTATION IPX
4MB MOD X104U 173
16MB MOD X116U 550
SPARCSTATION 2
16MB KIT X116W 550
SPARCSTATION 330
8MB KIT X108E 406
32MB KIT X134A 2269
SPARC 1, 3/60, 80, 4/40, 50, 65
4MB KIT X104C, G, H, Y 154
SPARC SLC (4/20)
4MB MOD X105Z 173
4/110
16MB KIT X1160 550
SPARC N, 4/40, 60, 65, 75
330, 370, 390
16MB KIT X116H, Y, WD 650
4/330, 4/370, 4/390
8MB KIT X108E 406
32MB KIT N/A 1400
SPARC IPI
16MB MOD X116F 550
SPARC 2
SPARCSERVER 630MP, 670MP, 690
64MB KIT X166A 2100

IBM

N51SX & N51SLC
2MB MOD 07G1878 $ 129
4MB MOD 07G1880 199
8MB MOD 07G1881 339
L40SX, N33SX LAPTOP
2MB MOD 79F0999 99
4MB MOD 78F1000 149
8MB MOD 79F1001 299
P75 & P70
2MB MOD 6450902 77
4MB MOD 6450128 149
P5/1 286
512K MOD 1057035 34
2MB MOD 92F9935 85
P5/1 386SX
512K MOD 1057035 34
2MB MOD 92F9935 85
4MB MOD 92F9694 149
PS/2 25
128K KIT 72X8955 29
PS/2 25 & 30 286
512K KIT 30F5348 39
2MB KIT 30F5360 85
0-16MB E-C N/A 129
PS/2 35SX, 35LS, 40SX
1MB MOD 6450603 42
2MB MOD 6450604 75
4MB MOD 87F9977 149
8MB MOD 6450129 299
PS/2 55SX & 55LS
1MB MOD 6450603 42
2MB MOD 6450604 75
4MB MOD 87F9977 149
0-16MB E-C 169
PS/2 57SX, M57SLC, 56SX, 56SLC, 76 & 77
2MB MOD 6450902 77
4MB MOD 6450128 149
8MB MOD 6450130 299
PS/2 70-081, 70-151, 121, 061, E51
1MB MOD 6450603 42
2MB MOD 6450604 75
0-32MB E-C 169
PS/2 70-A81, -A16, -A21, -A51, B51, B21
2MB MOD 6450608 75
0-32MB E-C 169
PS/2-80 A16, A21, A31
4MB MOD 6451060 199
0-32MB E-C 169
MODEL 90XP & 95X
INSTALL IN PAIRS
2MB MOD 6450902 77
4MB MOD 6450128 149
8MB MOD 6450130 299
16 BIT EXPANSION CARD FOR MODELS 50, 60, 55X, 65SX, 55LS MAXIMUM TWO CARDS PER MACHINE
0-16MB E-C 169
1MB MOD 6450603 42
2MB MOD 6450604 75
4MB MOD 87F9977 149
8MB MOD 6450129 299
4019 & 4019E
3.5MB F-C 1038675 159
4029
4MB MOD 1183335 157
THINKPAD 300
2MB CRD33G9288 155
8MB CRD33G2969 460
THINKP-AD 700T
8MB RCD6451167 460
THINKPAD 700 & 700C
2MB MOD7141G 133
4MB MOD07G1420 230
8MB MOD07G1421 399
N45SL
2MB MOD92F8834 115
CL57SX LAPTOP
2MB CRD07G1419 138
4MB CRD07G1420 230
8MB CRD07G1421 399
PS/1 CONSULTANT 2133, G11, G13, G14, ESSENTIAL W11, W13, W14, VALUEPOINT 325T & EXPERT S11, S13, S14
1MB MOD6450603 42
2MB MOD6450608 75
4MB MOD6450128 149
8MB MOD6450130 299
VALUEPOINT 425SX25, DX/33 & DX2/66 INSTALL IN FOURS
1MB MOD96F9260 45
4MB MOD96F9291 149
PRO 386SX N21-23
2MB MOD6450902 77
4MB MOD6450128 149
8MB MOD6450130 299
PS/2 80-041
1MB MOD6450375 69
PS/2 80-081, 111, 121, 181, 311 & 321
2MB MOD6450379 105
MODEL 35-50 OMF, OMT ECC MODULES
4MB MOD6451158 388
8MB MOD6451159 575
XSTATION 120 & 130
1MB VRAM4201 155
1MB MOD6450943 42
2MB MOD6450604 75
4MB MOD34F2933 149
93/6000 POWERSTATION POWERSERVER 220
4MB MOD6450128 149
8MB MOD6450130 299
RISC SYSTEM 6000
NO BOARD INCLUDED
16MB KIT 4033 1599
64MB KIT 4036 2900

LASER PRINTER MEMORY

FUJITSU RX 7100, 7200
2MB $ 235
KONICA LP3110, 3115
1MB 149
2MB 219
3MB 289
KYOCERA F1200S, F3200, F3200A
1-2-3-4MB CALL
KYOCERA F820, F1800, F1800A, F3600A, F5800
1MB 98
CITOH-4 PLUS + 8E
1MB 120
CITOH CI-6
1MB 125
2MB 165
4MB 225
CITOH CI-8
1MB 30
2MB 140
COMPAQ $CALL
PAGEMARQ 15 & 20 $CALL
DATAPRODUCTS LZR550 $CALL
EPSON EPL 4020, 4100, 8000, 8100 $CALL
PAINTJET XL300 $CALL
HP LASERJET FAX $CALL
PACKARD BELL PB8300 $CALL
AT&T 593 $CALL
TEC 1320S, 1321C, 1323D $CALL
FACIT P6360 $CALL
NCR 6435 $CALL
CITOH CI-6 $CALL
HARRIS/3M $CALL
ATARI SLM-804PCV $CALL
OASYS $CALL
MANNESMAN TALLY 305-805 $CALL
PHILLIPS NMS 1430 $CALL
IBM 4079 $CALL
KYOCERA 3/800AT $CALL
NEC SILENTWRITER 2/560, 550P, 552P 435 $CALL
SEIKOSHA OP104, OP108 $CALL
OLIVETTI PG108, PG208 $CALL
SHARP JX9700, -E, -H $CALL
OMS PS860, PS1700, 523MR $CALL
DIODATA DL810 & 410 $CALL

TOSHIBA

T1000SE
1MB C-C PCPA8311U $ 75
2MB C-C PCPA8312U 109
T1000LE
1MB C-C PCPA8311U 75
2MB C-C PCPA8312U 109
4MB C-C PCPA2001U 168
8MB C-C PCPA2002U 309
T1600XE
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Product Specification
Monthly Specials
Tech Support Hints
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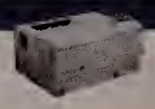

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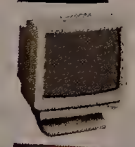

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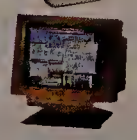

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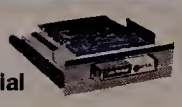

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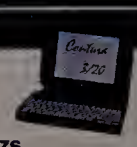

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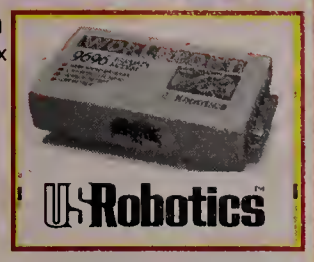

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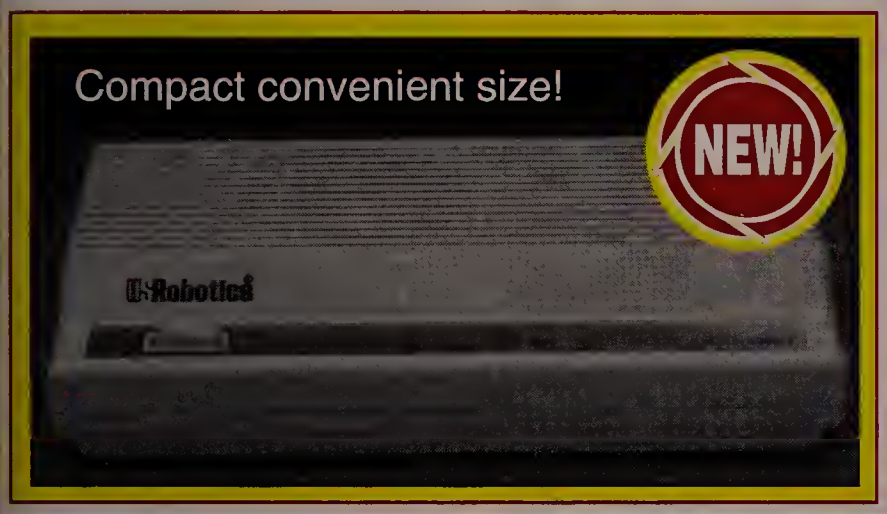

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8ravo 486/25, 33	2Meg Kit	500780-005	120.00
	8Meg Kit	500780-001	298.00
8ravo 486	2Meg Kit	500987-001	99.00
	4Meg	500987-002	159.00
	8Meg Kit	500987-003	318.00
	16Meg	500987-004	599.00
	32Meg Kit	500987-005	1200.00
Premium 386/25, 16 SX	1Meg	500718-001	55.00
Premium 386/33	1Meg	500718-002	56.00
Premium II 386SX20, 486-25, 25E, 33	1Meg	500780-003 WP8	60.00
	4Meg	500780-004 WP8	149.00
Premium Tower, 386/33TE, 486/25TE, 486/33TE	8Meg	500780-001 WP8	298.00

ZENITH MEMORY MODULES

MODEL	AMT. UPGRADED	AST PART #	PRICE
Z386/33, 25, 20, 33E	1Meg	ZA3800ME	50.00
Z386/33, 25, 20, 33E, 486/25E	4Meg	ZA3800MK	149.00
Z386SX	2Meg	Z-605-1 modules	99.00

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4MEG – 149.00 8MEG – 309.0016 8IT

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0-8Meg Extended and/or Expanded Memory for all I8M P/S2 Models 50, 50Z, 60, 55SX, 65SX, 16 8it, 4.0 LIM Compat.
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IBM PART NO.	WORKS WITH MODEL NO.	PRICE
30F5348 (512K)	30-286	30.00
30F5360 (2Meg)	30-286, 25-286, 50 MTHR 8D.	85.00
33G9288 (2Meg)	Thinkpad 300.	109.00
33G9288 (8Meg)	Thinkpad 300.	399.00
6450375 (1Meg)	80-041	79.00
6450379 (2Meg)	80-111, 311-121, 321, 081, 161	89.00
6451060 (4Meg)	80-A21, A-61, 80-A31, 80-111, 80-311	189.00
6450603 (1Meg)	35SX, 40SX, 55SX, Model-70's, P-70	54.00
6450604 (2Meg)	70-061, E61, 121, 50Z, 55SX, 65SX, P-70, 55LS, 65LS, X-Station 120 & 130, 35SX, 35LS, 40SX	77.00
6450608 (2Meg)	70-A21, A-61, 8-21, 8-61, 35SX, 35LS, 40SX Value Point 325T	84.00
78X8955 (128K)	25	35.00
34F2933 (4Meg)	35SX, 40SX, 55SX, 65SX, 55LS, 65LS	149.00
87F9977 (4Meg)	55SX, 55LS, 65SX, 40SX, 35SX, 35LS	149.00
1057035 (512K)	P/S1-286	40.00
92F9935 (2Meg)	P/S1 & P/S1/386SX-2121	84.00
92F9694 (4Meg)	P/S1 & P/S1/386SX, Model-2121	149.00
6450902 (2Meg)	56, 57, 57SX,90, 95, P-75, 57SLC Value Point 77 486DX2, 486SX, SVR 85	89.00
6450128 (4Meg)	57SX, 90, 95, P-75, 57SLC, 56, 56SLC, P/S1, 386SX, Models-2123, 2133, 2155. Value Point 77 486DX2, 486SX, SVR 85	149.00
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6450130 (8Meg)	56, 57, 57SX, 90, 95, P-75, 57SLC Value Point 77 486DX2, 486SX, SVR 85	299.00
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07G1826 (2Meg)	N51 (all)	99.00
07G1827 (4Meg)	N51 (all)	169.00
07G1828 (8Meg)	N51 (all)	309.00
07G1419 (2Meg)	CL57LSX Color LpTp, Thinkpad 700, 700C	169.00
07G1420 (4Meg)	CL57LSX Color LpTp, Thinkpad 700, 700C	219.00
07G1421 (8Meg)	CL57LSX Color LpTp, Thinkpad 700, 700C	359.00
92F8804 (2Meg)	N45SL	99.00

COMPAQ MEMORY MODULES

MODEL	AMT. UPGRADED	CMPQ PART #	PRICE
DeskPro 386/33, 386/33L,	2Meg Module	115144-001	99.00
486/25, 486/33L,	8Meg Module	116561-001	289.00
486/50L, System Pro	32Meg Module	116568-001	1500.00
DeskPro 386/33L, 486/33L	(Exp 8d)	116569-001	319.00
DeskPro 386/25, 386/20	1Meg Module	113131-001	79.00
	4Meg Module	113132-001	179.00
DeskPro 386S-16MHz	1Meg Exp 8d	113633-001	110.00
	4Meg Exp 8d	113634-001	219.00
	1Meg Module	113646-001	75.00
	4Meg Module	112534-001	179.00
DeskPro 386/20E	1Meg Exp 8d	113644-001	119.00
DeskPro 386/25E	4Meg Exp 8d	113645-001	219.00
	1Meg Module	113131-001	75.00
	4Meg Module	113132-001	179.00
DeskPro 286N, 386N,	1Meg Module	118688-001	50.00
386SX/20, 386/25M, 486/33M,	2Meg Module	118689-001	85.00
486S/25M, 486S/16M	4Meg Module	118690-001	159.00
M Series Exp 8d	0-64Meg	–	299.00
Port. 486C	8Meg Module	128877-001	319.00
DeskPro 386/16	1Meg Kit	108071-001	99.00
	4Meg Kit	108072-001	269.00
	1-2Meg	108069-001	239.00
	4-8Meg Exp	108070-001	399.00
DeskPro 286	512K Kit	113012-001	59.00
Prolinea 386	2Meg	141738-001	99.00
	8Meg	141742-001	299.00
Prolinea 486	1Meg	141682-001	55.00
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	4Meg	141684-001	159.00
	8Meg	141685-001	319.00

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LTE/286	1Meg 8d	117081-001	79.00
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LTE/286	4Meg 8d	117081-003	219.00
LTE/386S/20	2Meg Module	N/A	
LTE/386S/20	4Meg Module	121125-002	179.00
LTE LITE/20, 25, 25C	2Meg Module	129769-001	
LTE LITE/20, 25, 25C	4Meg Module	129769-002	179.00
LTE LITE/20, 25, 25C	8Meg Module	129769-003	389.00
LTE LITE/20, 25, 25C	16Meg Module	N/A	Call
LTE LITE 4/25C	4Meg Module	142337-002	
LTE LITE 4/25C	8Meg Module	142337-003	389.00
LTE LITE 4/25C	16Meg Module	142337-004	Call
SLT/286	1Meg Module	110235-001	79.00
SLT/286	4Meg Module	110237-001	219.00
SLT/386	1Meg Module	118303-001	79.00
SLT/386	2Meg Module	118304-001	109.00
SLT/386	2Meg Module	118305-001	179.00
Contura 320, 325	2Meg	139497-001	99.00
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T2000/T2000SX	2Meg	PC18-PA8317U	75.00
T2000SX/T1000LE	4Meg	PC-PA8314U	149.00
T2000SX/T1000LE	8Meg	PC14-PA8315U	269.00
T2000SXE/2200SX/T1800, 1850, C	2Meg	PC-PA2000U	75.00
T2000SXE/2200SX/T1800, 1850, C	4Meg	PC-PA2001U	149.00
T2000SXE/2200SX/T1800, 1850, C	8Meg	PC-PA2002U	269.00
T4400SX, SXC T6400	2Meg	PC-PA2003U	129.00
T4400SX, SXC T6400	4Meg	PC-PA2004U	169.00
T4400SX, SXC T6400	8Meg	PC-PA2005U	299.00
T4400SX, SXC T6400	16Meg	PC-PA2010U	599.00
T4400SX, SXC, T6400	32Meg	N/A	2999.00
T4500, T4500C	4Meg	PC-PA2012U	199.00
T4500, T4500C	8Meg	PC-PA2012U	349.00
T3300SL	2Meg	PC-PA2006U	99.00
T3300SL	4Meg	PC-PA2007U	159.00
T3300SL	6Meg	PC-PA2008U	229.00
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T3100SX	2Meg	PC15-PA8308U	85.00
T3100SX	4Meg	PC15-PA8310U	164.00
T3200	3Meg	PC6-PA7137U	184.00
T3200SX	2Meg	PC12-PA8307U	85.00
T3200SX	4Meg	PC12-PA8909	164.00
T3200SXC	2Meg	PC19-PA8318U	84.00
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T5200/T8500	2Meg	PC10-PA8304U	94.00
T5200/T8500	8Meg	PC10-PA8313U	299.00

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AST Notebook Prem Exec 386SX/20/25/25L	4Meg	500814-003,	139.00
AST Power Exec 3/25C	4Meg		189.00
AST Power Exec 425SL	2Meg		129.00
AST Power Exec 425SL	4Meg		209.00
AST Power Exec 425SL	8Meg		Call
AST Power Exec 425SL	16Meg		Call
AT&T Safari NSX/20	2Meg, 4Meg	PEC 37650, 37651	119.00,239.00
Bondwell 8310, Plus	1Meg	23050-09100	109.00
Bondwell 8310V, SX	1Meg		109.00
Bondwell 8310V, SX	4Meg		299.00
Dell 212, 320N, 320N+	2Meg	310-3204	119.00
Dell 325N, 325NC	2Meg	310-3210	119.00
Epson N83	4Meg	A808511	179.00
Epson N8/SL 20,25,25C	2Meg		129.00
	4Meg		219.00
	8Meg		479.00
Everex Tempo LX, LX20	2Meg	PCA 00053-0001	89.00
Everex Tempo Carrier	2Meg	PWA 0884-A-J000	119.00
Goldstar GS520 386SX/16	1Meg, 4Meg	S386-1M,S386-4M	99.00,249.00
Leading Edge D/LT 386SX	1Meg		109.00
Magnavox Metalis	1Meg, 4Meg	286, 386SX	89.00,199.00
NCR 3170	4Meg		289.00
NCR 3170	8Meg		519.00
NCR 3170	16Meg		999.00
NEC Ultralite III/20, 20P, 25C	2Meg	PC4721	Call
NEC Ultralite III/SL/25C	4Meg	PC4722	Call
NEC Ultralite SL/20, 20P	6Meg	PC4921	Call
NEC Ultralite III/25C	8Meg	PC4723	Call
Packard Bell 386SX, 286	1Meg, 4Meg	286, 386SX	89.00,199.00
Panasonic CF170, CF270, CF370	1Meg	CF-8A165	54.00
PCMCIA Cards:	1Meg, 2Meg		179.00, 319.00
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Prospeed 286, 386SX-16	1Meg	PC21-21	105.00
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Prospeed 486SX, SX/L	1Meg	OP-410-6204	Call
	4Meg	OP-410-6205	Call
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SX Alpha	2Meg	ZA-180-86	119.00
SX 8eta	2Meg	ZA-180-87	119.00
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HP 4	Call	80	149
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Panasonic 4410/4430	–	119	189
Panasonic 4420/4450I	89	119	189
Panasonic 4450	105	–	–
Epson 6000, Action Lsr.	–	115	179
Epson Action Laser II	Call	Call	Call
I8M Laser 4019, 4019E	–	–	139
Toshiba Page Laser 6	–	115	179
Packard 8ell P89500	–	115	179
OKi 400	–	99	–

	1MEG	2MEG	4MEG
Canon L8P4	129	179	–
I8M Laser 4029	–	–	139
HP III SI	55	–	139
Panasonic 4455	–	119	–
NEC 90, 290	–	119	–
NEC 95	–	99	–
OMS 410	119	159	249
TI XL/PS17/PS35	49	–	–
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Starscript 4	129	179	289
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120MB IDE	Ethernet	120MB IDE	660MB SCSI	1.2GB SCSI	120MB IDE	120MB IDE
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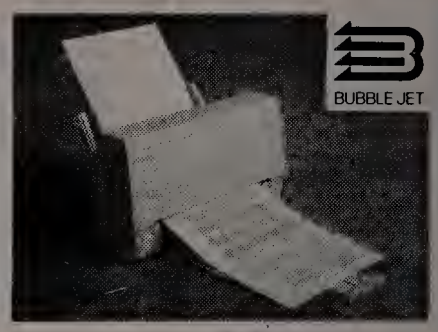

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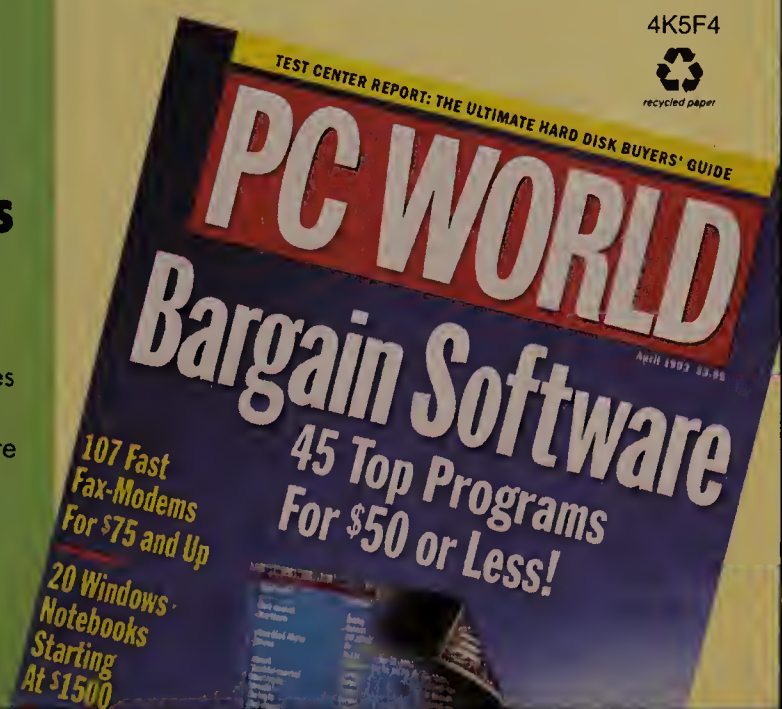

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Color Comes Out of the Darkroom

Color printing on the desktop is rapidly moving from charts and graphs to full photographic images, bringing darkroom power to PC users. Realtors can show prospective buyers scanned snapshots of homes. Attorneys and police use scanned images of crime and accident scenes in their work. Even my dentist thinks before-and-after color images of his work, printed on the bill, would soften its impact.

What will business users need to turn their PCs into photo darkrooms? Cutting-edge computing power, certainly. But they'll also need to rethink the way they approach their work. For example, I quickly learned a new way to fill 7.5MB of hard disk space fast: Use a 24-bit color scanner on a 2-inch-square snapshot at 800 dots per inch (dpi).

To gather hands-on experience with these new technologies, I began working with the outstanding Tektronix Phaser 200e color printer, using Mustek's ColorArtist Pro CG-8000 handheld 24-bit color scanner to gather the images. I edited them with U-Lead's *ImagePals* and Micrografx's *PhotoMagic* from the *Graphics Works for Windows* bundle. For descriptive text on my printouts, I tried out Agfa's *Discovery TrueType Pack*.

Mustek ColorArtist Pro CG-8000

I've been using Mustek's CG-6000 18-bit color scanner for about a year. It produces good images, is easy to use, and comes with TWAIN-compliant software, meaning I can scan images from within any software that supports the popular TWAIN interface standard.

Mustek's new $599 CG-8000 scanner delivers sharper, more detailed images than the CG-6000, but it sports one of the most poorly designed *Windows* software interfaces I've seen. Strange words and incomprehensible phrases, such as 'Warnning' [sic] and 'The scanner starts to Warmup' seem to be trying to tell you what's happening. These puzzling messages are ironic, because the older scanner interface is smooth and intuitive. Nor does the updated software provide any way to interrupt a scan and preserve the portions of the image that are already read (the old software did). This means you must select the image size before initiating the scan and keep moving the scanner until you reach that size. Awkward, and hard on the wrist, too.

"Foulks's Favorite" Tektronix Phaser 200e: Look, Ma, no acetic acid!

About that big 7.5MB file: Scanning an image at 800 dpi has little practical value for most users, because few output devices can handle such minute detail. Photographically, such high resolution is greater than the grain size of common enlarging papers. If you have images of comparable detail and really need such high resolution, then be prepared to work slowly. Color data mapping a 2-inch-square snapshot to produce a TIFF file took me 14 minutes! Later, I used *ImagePals'* JPEG (Joint Photographic Experts Group) compression to reduce the file to 331K. (The CG-8000 ships with a "light edition" of Micrografx's *Picture Publisher*, called *Picture Publisher LE*, but that program is too stripped down for serious editing.)

Yes, I did try to use the older software with the new scanner, and no, it didn't work. Fortunately, the new software *does* work, and I was pleased with the images. In actual use, the CG-8000 warms up faster and appears to accept data faster than its predecessor. But please, Mustek, redo the software—and while you're at it, add JPEG file compression support. As of this writing, though, I've reinstalled the CG-6000.

U-Lead ImagePals and Micrografx PhotoMagic

It may seem strange to describe these two competing products in tandem, but I wouldn't be without either of them.

I was tipped to *ImagePals* by *PC World* senior features editor Steve Fox, who also finds it invaluable. Yet it's hard to find in stores, and little seems to be written about it. Maybe the name is too cute; it certainly doesn't suggest what a useful business tool *ImagePals* is.

ImagePals has an image editor (Enhancer), a screen capture module, and a slide-show feature, but its forte is the way it handles images, by means of an integrated tool named Album. Working across my *LANtastic* network, Album gathered thumbnail images of several hundred graphics files and presented me with an excellent display—21 images per screen—of *all* my TIFF, GIF, BMP, and JPG files. I printed the thumbnails and weeded out the images I'd scattered across nine hard drives and four machines over the past few years.

By Thom Foulks

With the Album module, I was able to create additional albums and move files to them selectively with drag-and-drop ease. Drag-and-drop is available throughout *ImagePals;* from within the Album display, it is easy to drag an image to—get this—*PhotoMagic* for an editing session. *ImagePals'* Tools menu allows easy addition of other applications, each displayed with its native icon.

After I completed the scanning and editing of a group of snapshots, it took only a couple of mouse clicks in Album to send them all to the printer in one batch. That's power and ease of use I hadn't realized I was missing.

ImagePals has its weaknesses: Oddly, in a program that handles color images well, the icons are all in gray scale. And the tool icons in its Enhancer module lack text descriptions, which leaves you searching through the 250-page manual trying to fathom which does what. Digging into the manual, though, is a good idea: It contains some of the best documentation I've seen, telling you not only what but often why and why not.

If your budget can tolerate only one graphics package, *ImagePals 1.2* is the choice. U-Lead has an introductory offer of only $99 through the end of May; list price afterward will be $249.

On the other hand, if you'd like to avoid using a manual and still get powerful color-graphics image editing, the choice is *PhotoMagic.* Within minutes of installing *PhotoMagic,* I had brightened the highlights in the eyes of someone in a snapshot and removed the reflection of the camera's flash (a dreary task that has cost me hours and innumerable unsuccessful prints in the darkroom).

PhotoMagic is the premier component of Micrografx's *Graphics Works* bundle. Also included are modules for drawing, charts and graphs, and slide-show presentations as well as thousands of clip art images (on the CD ROM version). Look for a street price of $190 or so for the bundle (*PhotoMagic* alone costs about $99 on the street). Compared to Micrografx's highly rated, high-end *Picture Publisher, PhotoMagic* delivers surprisingly strong functionality with a superbly intuitive interface (and a manual that's just over ¼ inch thick).

Agfa Discovery TrueType Pack

When Hewlett-Packard went looking for a print-scaling technology to build into its laser printers, it picked Intellifont from Agfa, so you would expect a TrueType font pack from Agfa to be at least a tad ahead of the competition. It is. The *Discovery* pack's 46 fonts include 15 clip art fonts, so called because each keystroke (or combination of keystrokes) can produce a separate, scalable, graphics image. Agfa says the package has more than 1000 symbol graphics; luckily, the company provides a *Windows* file that displays the images along with the keystrokes that produce them. Among the text fonts, I particularly like the Revue Shadow font for captioning photos; and the typefaces in the Garth Graphic family can help you produce distinctive and coordinated correspondence.

Photographers know the thrill of turning a photo into a classic. The thrill is sweeter when the picture emerges from your desktop printer.

But the real added value of this $79 (list price) package lies in its help files. Printed documentation is only a small pamphlet. The help files, however, are well-illustrated examples of the fonts and how they should be used—recommended reading for anyone who's using scalable fonts.

Tektronix Phaser 200e

I've saved the best for last. This $3695 PostScript Level 2 or HP-GL printer is a winner. Its 17.5-by-13.4-inch footprint is smaller than that of the Panasonic KX-P4420 that usually sits on my printer stand, and its technology is at the cutting edge of low-cost color printing.

Avid photographers know the thrill of turning a mundane snapshot into a personal classic. That thrill is sweeter when the picture emerges from a printer on your desk, minus the aggravation of formaldehyde and acetic acid.

No, the output is not glossy-photo quality, but the 300-dpi prints rival magazine images, and my office has become a veritable photo gallery. (I usually give visitors a few moments to tour the display while I answer the inevitable questions: "You did these? Right here?")

Many of the prints are on laser-quality bond paper. In an innovative twist on thermal-wax-printing technology, the Phaser 200e coats the paper's image area with wax prior to printing the color image. This process makes an odd sound. You'll wish Tektronix had put a transparent panel on the printer housing so you could observe the action. Due to the wax coating, the final image retains a glossiness, brightly saturated with color. The best prints, however, are on true thermal-wax paper or on dazzling overhead slide transparencies.

Tektronix estimates cost per printed image at about 56 cents on coated paper, 59 cents on laser bond—the price doesn't vary with image size as it does with ink jet color printers. The engine speed, rated at up to 2 pages per minute, of course varies with image size, density, and all the software factors that affect graphics printing. That meant printing some of my 8-by-10-inch snapshots took 20 minutes or longer, but I've spent hours in a darkroom to walk out with only *one* print to show for all that time.

Indeed, a Foulks Favorite. Any business in need of color graphics printing should look at the Phaser 200e.

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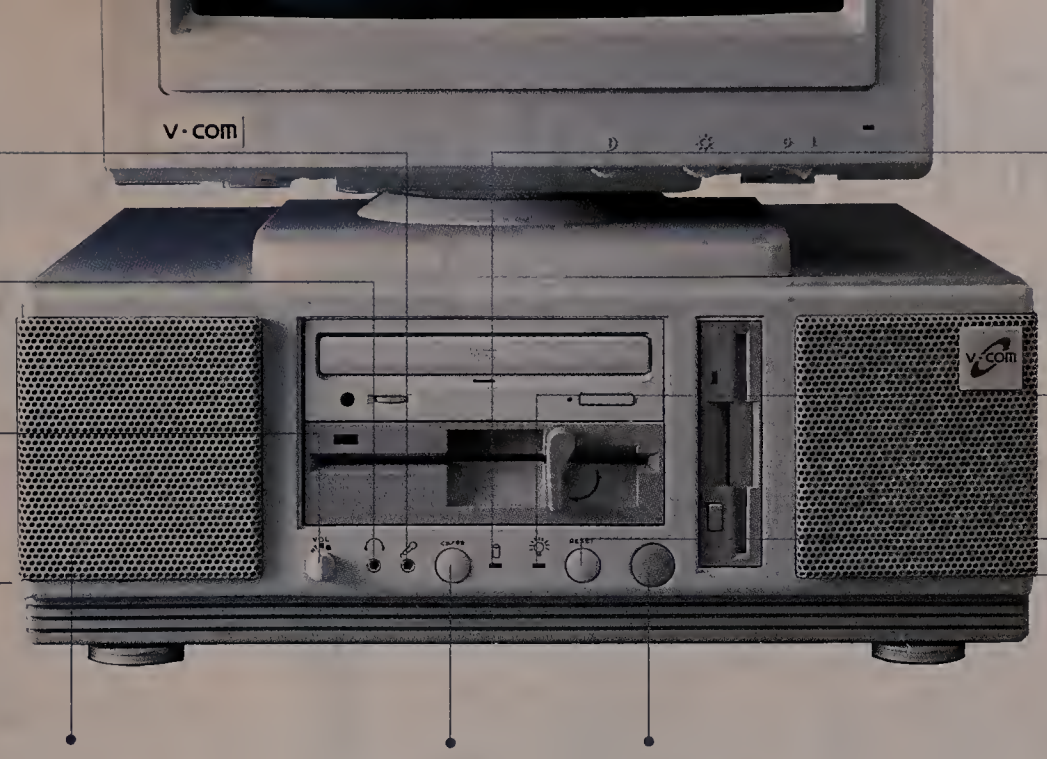
Thom Foulks is a contributing editor for PC World.



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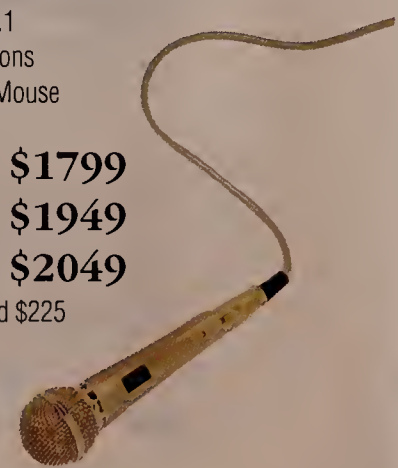

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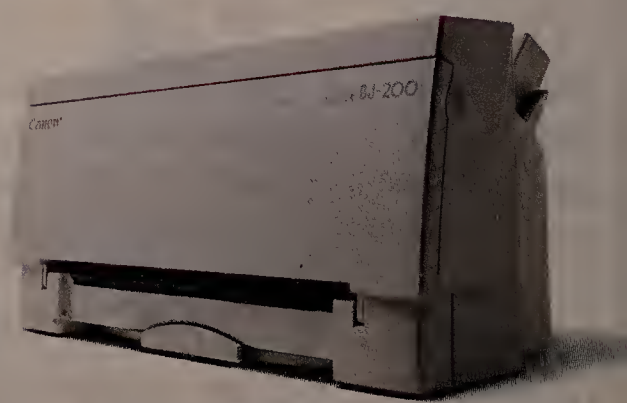

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The Children of Tetris

Late in 1990, Microsoft, which is usually all business, put out its first *Entertainment Pack*. It was a collection of brilliant *Windows*-based coffee-break diversions that included several solitaire variations and a dangerously addictive amusement called Tetris, which had you rotate odd-shaped blocks as they fell from the top of the screen toward an irregular landscape below.

Now, roughly two years later, there are four *Entertainment Pack*s, still $39.95 a pop. Each has its own special charms and its own superstars, such as Tetris.

Ooze It or Lose It

EP 2 includes a couple of solitaire games, the best of which is a beautifully conceived logic puzzle called FreeCell—the only game Microsoft plans to include with Windows NT. Unlike most other solitaire games, virtually every game can be won—if you deduce the right strategy. In addition, you get a PC version of mah-jongg, plus Rattler-Race, one of those hair-trigger-reflex exercises in which you use the cursor keys to help a snake eat a bunch of apples. Rodent's Revenge is a clever cat-and-mouse game in which the mouse gets to zap those nasty cats by pushing around rows of blocks to form cat traps.

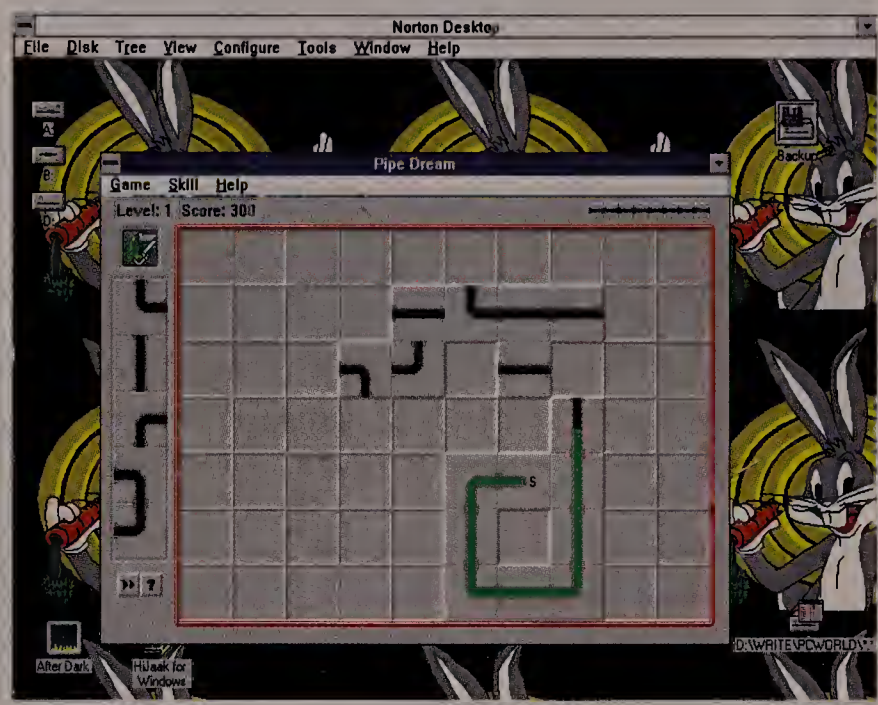
The most dangerous game in *EP 2* is Pipe Dream, licensed from LucasArts. A faucet appears in the middle of the screen and begins to ooze goo. Meanwhile, a series of odd-shaped pipes appear at the side of the screen. Some are vertical, some are horizontal, some are curved. You use your mouse to place each new section of pipe—the idea being to route the oozing goo to a special exit. Sounds easy, right? I started fooling around with this game, and when I looked up from the PC, *2 hours* had disappeared! If I had a skull-and-crossbones icon, I'd use it here.

By Michael Goodwin

Beware the Hungry Yeti

EP 3 includes a Vegas-style solitaire game called TriPeaks. Sure, it's just another solitaire game, but this one is a charmer. The rest of the games are more unusual, and a couple are very sophisticated.

SkiFree is essentially mindless: You control a skier shooshing down a slope, using your cursor keys to avoid trees, dogs, and other skiers. The only amusement came when I climbed high above the starting line and got eaten by a yeti.



Things improve with Klotski, a mind-bender that may hold your interest for hours while you try to free a red block by moving blue ones out of the way.

The big winners of *EP 3* are WordZap and Fuji Golf. WordZap is gripping as well as being a great vocabulary builder. You get between 8 and 15 random letters, from which you must create seven different words. But you're in a race with the computer, and if either of you comes up with a word that the other has already used, that word drops out of play. You can also play against another human being if you connect your PCs with a null modem cable.

Fuji Golf is a great simulation set on an 18-hole Japanese golf course. You can select clubs, estimate distance, direction, and wind, and choose how hard to hit the ball. There's only a theoretical connection to real golf, but I did discover one strong similarity: Fuji Golf is amazingly relaxing.

Hello Central, Give Me Dr. Black Jack

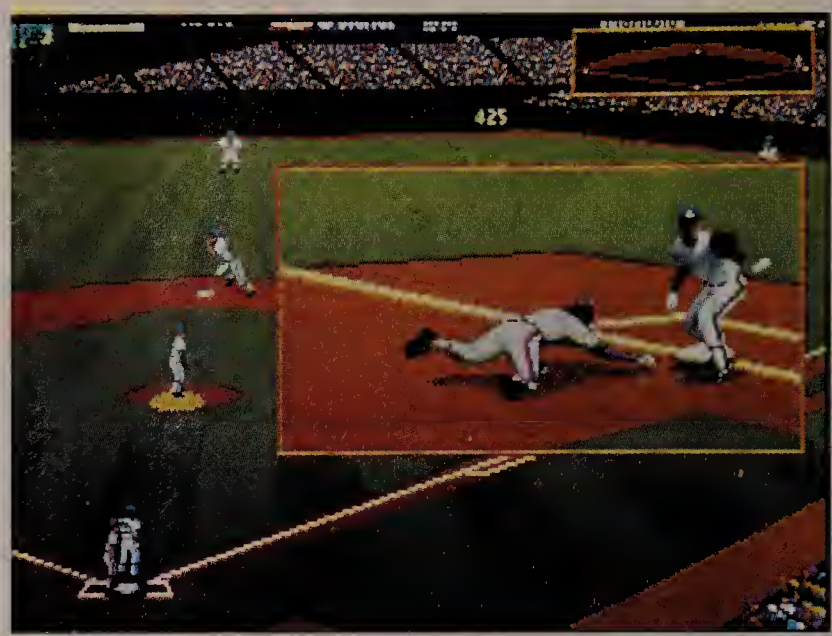
EP 4 is the latest in the series and uses the sound capabilities of *Windows 3.1*. Not all of the games here are soul-shakers, of course, but you do get three that are marvelous. Dr. Black Jack is a casino blackjack simulation, with one sensational variation: If you like, the Doc will tutor you in winning game strategy—including card-counting—while you play. Chip's Challenge is an adventure game in which you make your way through a huge set of rooms on countless levels, collecting chips, overcoming obstacles, and eluding tanks, fireballs, bear traps, and a menagerie of monsters. Clever sound effects and simple animation make the adventure even more charming. This one alone is worth the price of admission.

> Pipe Dream deserves a skull-and-crossbones icon. Don't start this habit-forming game if you have deadlines pending.

But *Entertainment Pack 4*'s pièce de résistance is...Chess. That's right, a full-featured computer chess program—only slightly less sophisticated than games costing upwards of $100. You get hints, an on-screen clock, a display of threatened pieces, even speech synthesis. Five levels of play make it easy for anyone to win; even *I* was able to beat the computer (once).

Take Me Out to the Joystick

It's that time of year when even folks whose baseball gloves are *way* back in



HARDBALL III'S BUILT-IN TV DIRECTOR automatically cuts into multiple-image close-ups to guarantee a view of all the action.

the closet grow sentimental at the crack of the bat. This season you can indulge your sentiment with *Al Michaels Announces HardBall III.*

This highly realistic simulation lets you pitch, bat, and field in eight major league ballparks—and manage a team through an entire 162-game season, complete with an all-star game, playoffs, and a World Series. If you pony up an extra $25 for the *MLBPA Players Disk,* you'll be able to populate those games with members of last season's 26 major league teams—650 players, complete with faces and statistics. The game works great using the keyboard, but a joystick will make the process more fun.

HardBall III shows the action from the batter's or pitcher's point of view or lets the computer switch back and forth to follow the play best. The on-screen action looks great as long as you're focused on the batter or the pitcher; base running and fielding animation is crude. The teams look more like *Ms. Pac-Man* than big leaguers.

Al Michaels' play-by-play commentary is one of the game's selling points, but while the veteran sportscaster's voice is recognizable, the software that assembles his bits and bytes needs a *lot* of work. The result sounds like HAL with a lobotomy.

If you ever dig out that glove, *HardBall III* may even improve your game. It does a great job of letting you analyze the breaking pitch in that fraction of a second before you swing—or don't swing. Despite the mechanical commentary and uneven animation, it succeeds in combining the joys of watching a ballgame and playing in one.

- **Microsoft Entertainment Packs 1.0 volumes 1 through 4** $39.95 each; Microsoft Corp.; 800/426-9400
  Reader service no. 706
- **Al Michaels Announces HardBall III** $59.95, MLBPA Players Disk $24.95; Accolade; 800/245-7744
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Michael Goodwin is a contributing editor for PC World. *He can be reached as MGOODWIN on PC World Online (see page 10 for more information).* ■

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Quick Edits for Small Documents

More and more, I find myself having to write short unformatted documents—such items as reminder notes, E-mail messages, and batch files. Loading a word processor for these simple chores is a waste of time (*WordPerfect* is annoying enough, but bringing *Ami Pro* up on my underpowered computer seems to take years), and having to save its output as a straight ASCII file is a nuisance. What's more, I don't want a big program hanging around, taking up precious resources, for an occasional two-paragraph memo.

Straight and Simple Text

For the last year I've been playing with text editors for these quick jobs because they're light and nimble, letting me get in, do the work, and move on to other projects. I also save scads of time because I'm less likely to futz around with dozens of fonts, trying to create fancy memos that take an hour to design and 5 minutes to read. And the text editors I use—in *Windows* and in DOS—are either already on your hard disk or just a quick download away.

If you're using DOS 5.0, you can get into a text editor simply by typing **EDIT** at the DOS prompt (make sure your DOS directory is in your PATH). DOS's EDIT has mouse support, a context-sensitive help system, and some limited *Word* and *WordStar* keystrokes. While it's better than EDLIN (isn't everything?), don't expect anything fancy: There are no word wrap or page break functions, no macro features, and very few shortcut keys. You'll also get a silly 'Press Enter to see the Survival Guide' message whenever you load EDIT without a file name parameter. And make sure that DOS's QBASIC.EXE is also in a directory in your PATH, because EDIT won't run without it.

But listen, there's something better. I use SemWare's *QEdit*, a shareware text-editing prize, because it's stuffed with handy features. To start with, not only can I edit multiple files, but I can load them all with one command from the DOS prompt. For instance, I can bring up both AUTOEXEC.BAT and CONFIG.SYS with **Q C:\AUTOEXEC.BAT CONFIG.SYS**, or load all my batch files with **Q C:\BATCH*.BAT**.

QEdit also has exceptionally flexible keyboard configuration and a powerful macro language, letting me assign editor commands and macros to almost any key. I've assigned keys—using a simple ASCII file—to duplicate the best keystrokes of *WordStar* and *WordPerfect*, saving my fingers from having to learn anything new.

QEdit is a small program—the EXE file takes up only 45K—perfect for a notebook or palmtop. There's also a TSR version that needs a measly 9K of conventional memory, provided you have expanded or extended memory. • *QEdit Advanced $54.95, SemWare; 404/641-9002, 404/640-6213 (fax), 404/641-8968 (BBS). Find QEDIT-215.ZIP on PC World Online and other on-line services. Reader service no. 723*

Graphical Text

When I use *Windows*, Notepad and Write are surprisingly good for most jobs and, coming free in the box, they're priced just right. But if I'm juggling four or more text files, I turn to Computer Witchcraft's *Mega Edit*, because it's not only capable of loading 25 files at once, but it also lets me split the screen and edit two files together. *Mega Edit* has virtually no limit on file size, so I can work easily with a 2MB, comma-delimited mailing list file. And if you ever need to edit, import, or export a Unix or Macintosh text file, *Mega Edit* will gladly oblige. • *Mega Edit $35.50, Computer Witchcraft; 415/752-2477, 415/752-8971 (fax). Available as MEGAED.ZIP on PC World Online and other on-line services. Reader service no. 724*

However you create your text files, you may want to proof them occasionally. To make sure these documents are error free, take a look at *ShareSpell*, a $20 shareware spelling checker. Don't let the low price fool you—*ShareSpell*'s 112,000-word dictionary is surprisingly fast and accurate for document checking. And for keeping your grammar in line, consider *PC-Proof*, which prevents my participles from dangling and keeps my infinitives unsplit. Both *ShareSpell* and *PC-Proof* are DOS programs, by the way; I've yet to find *Windows* proofing tools at such bargain-basement prices. • *ShareSpell $20, Acropolis Software. Available as SS24B.ZIP on PC World Online and other on-line services.* • *PC-Proof $40, Intellect Systems; 206/226-0429. Find PCPROF15.ZIP on PC World Online and other on-line services. Reader service no. 725*

Sure, I *know* you love your word processor—I wouldn't abandon mine either. But for knocking out those quick jobs, nothing beats a text editor.

Contributing Editor Steve Bass is the president of the Pasadena IBM Users Group. He can be reached as PCW STEVE on PC World Online (see page 10 for more information).

By Steve Bass

DAVID CSICSKO

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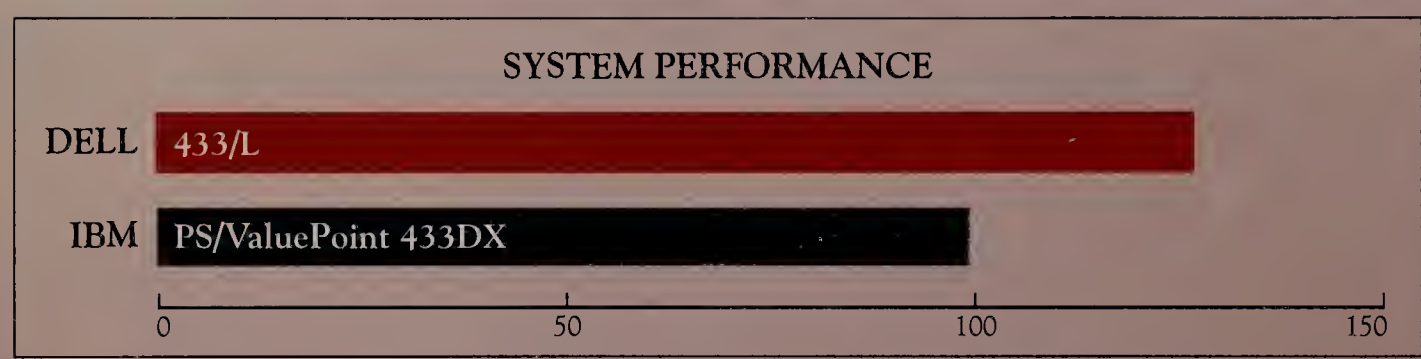

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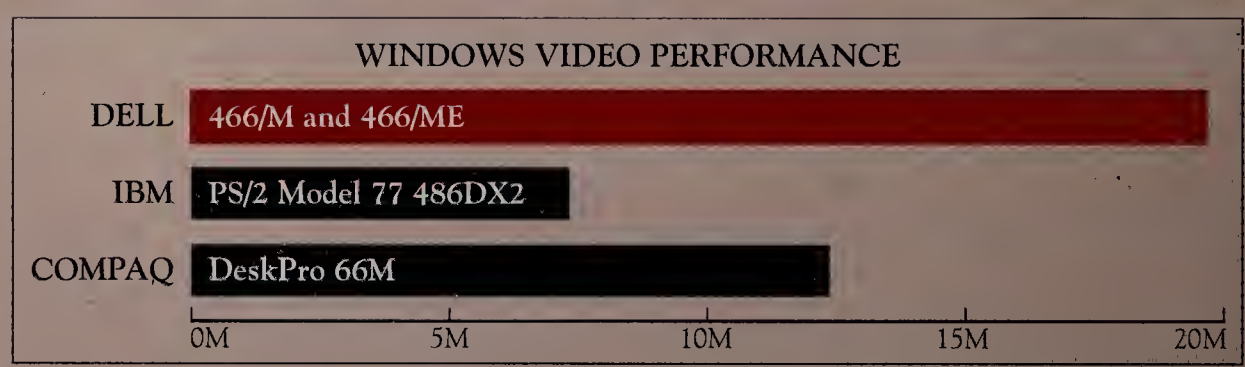

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